

To: James Cashwell From: Chris Ricardi Date: October 22, 2013

Subject: 51 Eames Street Property Slurry Wall Quarterly Monitoring Program 2Q13 -

May 2013

DATA VALIDATION REPORT
MAY 2013 SLURRY WALL GROUNDWATER AND SURFACE WATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS

TestAmerica Laboratories Data Sets: 480-37930-1, 480-37932-1, 480-38141-1,

480-38147-1, and 480-38209-1

1.0 INTRODUCTION

Groundwater and surface water samples were collected from the Olin Chemical Superfund Site on May 7 through May 10 and May 13, 2013. Samples were analyzed by TestAmerica Laboratories Inc. in Buffalo, New York. Data were reported in sample delivery groups (SDGs) 480-37930-1, 480-37932-1, 480-38141-1, 480-38147-1, and 480-38209-1. A summary of samples included in this review is contained in Table 1. Samples reviewed in this report were analyzed for the following USEPA SW-846 (USEPA, 1996), USEPA wastewater (USEPA, 1993), or Standard Methods (APHA, 1995):

- Dissolved Metals (aluminum and chromium) by USEPA Method 6010B in groundwater
- Dissolved and Total Metals (aluminum, chromium, and sodium) by USEPA Method 6010B in surface water
- General chemistry analyses for ammonia by USEPA Method 350.1 (Lachat 10-107-06-1B), chloride and sulfate by USEPA Method 300.0, nitrate and nitrite by USEPA Method 353.2, and specific conductance by SM 2510B

The Final Interim Response Steps Work Plan (MACTEC, 2007) and the MassDEP Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP) [MassDEP, 2010] were used as references during the review. Analytical packages were reviewed using the Level 1 Data Quality Evaluation checklists that were developed for the Olin Wilmington monitoring tasks. Final sample results are presented on data summaries in Table 2. A summary of validation qualification actions is presented on Table 3. Validation reason codes are associated with final results that have been qualified as indicated in Table 3.

Sample chain of custody and containers did not list a time or date of collection for sample OC-DUP-GW; the date of 05/09/13 and time of 12:00 was used by the lab for the login.

Data Validation Report - May 2013 Slurry Wall Groundwater And Surface Water Olin Chemical Superfund Site Wilmington, Massachusetts

2.0 METALS

Data were reviewed for the following parameters:

- **Data Completeness**
- Holding Time
- **Blanks**
- Laboratory Control Sample / Laboratory Control Sample Duplicate Analysis (LCS/LCSD)
- Matrix Spike / Matrix Spike Duplicate Analysis (groundwater only)
- Field Duplicate
- **Detection Limits**
- Dissolved vs. Total Metals Comparison (surface water only)
- indicates that criteria were met for this parameter

3.0 GENERAL CHEMISTRY - Ammonia, Chloride, Sulfate, Nitrate, Nitrite, and Specific Conductance

Data were reviewed for the following parameters:

- **Data Completeness**
- **Holding Time**
- **Blanks**
- Matrix Spike Analysis
- Laboratory Duplicate Analysis (ammonia and nitrite only)
- Laboratory Control Sample / Laboratory Control Sample Duplicate Analysis Field Duplicate
- **Detection Limits**
- indicates that criteria were met for this parameter

SDG 480-38141-1

Field Duplicate – Ammonia

A field duplicate was collected with field sample OC-GW-34SR-XXX. The relative percent difference (RPD) between the ammonia concentration reported in the sample (0.15 mg/L) and the field duplicate (0.076 mg/L) of 65 was above the control limit of 50. Ammonia results were qualified estimated (J) for the sample and field duplicate. Qualified results are presented on Table 3 with a validation reason code of FD.



Data Validation Report – May 2013 Slurry Wall Groundwater And Surface Water Olin Chemical Superfund Site Wilmington, Massachusetts

Chris Kicards	10/22/2013
Chris Ricardi, NRCC-EAC Senior Chemist	Date
My Murphy	10/22/2013
Michael Murphy Project Principal	Date

References:

- American Public Health Association (APHA), 1995. "Standard Methods for Examination of Water and Wastewater"; 19th Edition; APHA, 1015 Fifteenth St., NW. Washington, DC 20005.
- MACTEC, 2007. "Final Interim Response Steps Work Plan"; Olin Chemical Superfund Site; 51 Eames Street, Wilmington, Massachusetts; August 8, 2007.
- Massachusetts Department of Environmental Protection (MassDEP), 2010. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; July 2010.
- U.S. Environmental Protection Agency (USEPA), 1993. "Methods for Chemical Analysis and Water and Wastes (MCAWW)", EPA/600/4-79-020 (March 1983) with updates and supplements EPA/600/4-91-010 (June 1991), EPA/600/R-92-129 (August 1992) and EPA/600/R-93-100 (August 1993).
- U.S. Environmental Protection Agency (USEPA), 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; November 1986; Revision 4 December 1996.

Table 1 Sample Summary Data Validation Report May 2013 Slurry Wall / Cap Groundwater and Surface Water Olin Chemical Superfund Site

Wilmington, Massachusetts

						E350.1			
				SW846 6010B	SW846 6010B	(QuickChem		40CFR136A	
				Total	Filtered	10-107-06-1-B)	A2510B	300.0	E353.2
Lab Sample ID	Location	Sample ID	Sample Date	Metals	Metals	Ammonia	Conductance	Anions	Nitrate/Nitrite
Groundwater									
480-37930-1	GW-10S	OC-GW-10S-XXX	5/7/2013		2	1	1	2	
480-37930-2	GW-76S	OC-GW-76S-XXX	5/7/2013		2	1	1	2	
480-37930-3	GW-24	OC-GW-24-XXX	5/7/2013		2	1	1	2	
480-37930-4	GW-35S	OC-GW-35S-XXX	5/8/2013		2	1	1	2	
480-37930-5	GW-CA1	OC-GW-CA1-XXX	5/8/2013		2	1	1	2	
480-37930-6	GW-201S	OC-GW-201S-XXX	5/8/2013		2	1	1	2	
480-37932-1	GW-25	OC-GW-25	5/7/2013		2	1	1	2	
480-37932-2	GW-202D	OC-GW-202D	5/7/2013		2	1	1	2	
480-37932-3	GW-202S	OC-GW-202S	5/7/2013		2	1	1	2	
480-37932-4	PZ-18R	OC-PZ-18R	5/8/2013		2	1	1	2	
480-37932-5	PZ-25	OC-PZ-25	5/8/2013		2	1	1	2	
480-37932-6	PZ-24	OC-PZ-24	5/8/2013		2	1	1	2	
480-38141-1	GW-34SR	OC-DUP GW	5/9/2013		2	1	1	2	
480-38141-2	GW-78S	OC-GW-78S-XXX	5/9/2013		2	1	1	2	
480-38141-3	GW-79S	OC-GW-79S-XXX	5/9/2013		2	1	1	2	
480-38141-4	PZ-16RR	OC-PZ-16RR-XXX	5/10/2013		2	1	1	2	
480-38147-1	MP-2 #13	OC-MP-2PORT13-XXX	5/9/2013		2	1	1	2	
480-38147-2	GW-34D	OC-GW-34D-XXX	5/9/2013		2	1	1	2	
480-38147-3	GW-34SR	OC-GW-34SR-XXX	5/9/2013		2	1	1	2	
480-38147-4	GW-43SR	OC-GW-43SR-XXX	5/9/2013		2	1	1	2	
Surface Water									
480-38209-1	ISCO1	OC-ISCO1	5/13/2013	3	3	1	1	2	2
480-38209-2	ISCO2	OC-ISCO2	5/13/2013	3	3	1	1	2	2
480-38209-3	ISCO3	OC-ISCO3	5/13/2013	3	3	1	1	2	2
480-38209-4	PZ-16RR	OC-PZ-16RRSW	5/13/2013	3	3	1	1	2	2
480-38209-5	PZ-17RR	OC-PZ-17RRSW	5/13/2013	3	3	1	1	2	2
480-38209-6	PZ-18R	OC-PZ-18RSW	5/13/2013	3	3	1	1	2	2
480-38209-7	SD-17	OC-SD-17	5/13/2013	3	3	1	1	2	2
480-38209-8	PZ-18R	OC-DUP SW	5/13/2013	3	3	1	1	2	2

Notes:

Number listed under method indicates number of target analytes reported.

Prepared by / Date: KJC 05/28/13 Checked by / Date: TDL 09/3/13

Final Results Summary Data Validation Report

May 2013 Slurry Wall / Cap Groundwater and Surface Water

Olin Chemical Superfund Site Wilmington, Massachusetts

			Loc Name	GW-1	10S	GW-201S		GW-2	GW-202D		02S	GW-	-24	GW	-25	GW-	34D
		Fie	eld Sample ID	OC-GW-1	0S-XXX	OC-GW-2	01S-XXX	OC-GV	/-202D	OC-GW	-202S	OC-GW-	24-XXX	OC-G	W-25	OC-GW-3	34D-XXX
		Field	Sample Date	05/07	7/13	05/08	05/08/13		05/07/13		7/13	05/07/13		05/07/13		05/09	9/13
			QC Code	FS FS		FS		FS		FS		FS		F	S		
	Lab Sample Delivery Grou		elivery Group	480-37	930-1	480-37930-1		480-37932-1		480-37932-1		480-37	930-1	480-37	932-1	480-38	147-1
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	3100		200	U	7600		200 (J	200	U	200	U	200	U
F	SW6010	Chromium	ug/l	5 l	IJ	36		790		3.9 、	J	5 (U	4.8	J	12	
N	E300	Chloride	mg/l	10		43		280		70		27		150		12	
N	E300	E300 Sulfate mg/l		48		1100		2000		320		37		92		35	
N	E350.1	E350.1 Nitrogen, as Ammonia mg/l		1.3		110		160		53	53		29		42		
Ν	A2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	150		2200		4000		1000		360		880		210	

Notes:

N = normal

F = filtered

FS = field sample

FD = field duplicate

U = not detected, value is the reporting limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Final Results Summary Data Validation Report

May 2013 Slurry Wall / Cap Groundwater and Surface Water

Olin Chemical Superfund Site Wilmington, Massachusetts

			Loc Name	GW-34SR		GW-34SR		GW-35S		GW-43	3SR	GW-7	'6S	GW-	78S	GW-	79S
		Fie	eld Sample ID	OC-DU	P GW	OC-GW-3	4SR-XXX	OC-GW-	35S-XXX	OC-GW-43	SR-XXX	OC-GW-76	6S-XXX	OC-GW-7	78S-XXX	OC-GW-7	9S-XXX
		Field	Sample Date	05/09	9/13	05/09/13		05/08/13		05/09/13		05/07/13		05/09/13		05/09	9/13
	QC Cod		QC Code	FD	FD FS		FS		FS		FS		FS		FS	3	
		Lab Sample Delivery Group		480-38	141-1	480-38147-1		480-37930-1		480-38147-1		480-379	930-1	480-38	141-1	480-38	141-1
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	200 l	U	200	U	200	U	350		200 L	J	200	U	200	U
F	SW6010	Chromium	ug/l	1.8 、	J	1.9	J	12		1.6 J	ı	1.2 J	l	2.9	J	7.4	
N	E300	Chloride	mg/l	2.3		2.2		7.1		270		15		20		160	
N	E300	Sulfate	mg/l	7.9		7.8		440		34		30		490		1200	
N	E350.1	Nitrogen, as Ammonia	mg/l	0.076	J	0.15	J	20		1.8		6.4		43		120	
Ν	A2510B LAB SPECIFIC CONDUCTANCE umhos/cm		64		64		1200		990		990 170			1400		3000	

Notes:

N = normal

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FD = field duplicate

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J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Final Results Summary Data Validation Report

May 2013 Slurry Wall / Cap Groundwater and Surface Water

Olin Chemical Superfund Site Wilmington, Massachusetts

			Loc Name	GW-0	CA1	MP-2	MP-2 #13		PZ-16RR		18R	PZ-	24	PZ-	25
		Fie	eld Sample ID	OC-GW-C	A1-XXX	OC-MP-2PC	RT13-XXX	OC-PZ-16RR-XXX		OC-PZ-18R		OC-PZ-24		OC-P	Z-25
		Field	Sample Date	05/08	3/13	05/09	05/09/13		05/10/13		8/13	05/08/13		05/08	3/13
	QC Code		FS	FS		FS		FS		S	FS		F	3	
	Lab Sample Delivery Group		480-37930-1		480-38	480-38147-1		480-38141-1		480-37932-1		932-1	480-37	932-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	200	J	120	J	200	U	200	U	200	U	200	U
F	SW6010	Chromium	ug/l	4.3 、	J	21		4.3	J	36		17		9.1	
N	E300	Chloride	mg/l	6.2		87		130		510		16		18	
N	E300	Sulfate	mg/l	52		22		830		1500		650		470	
N	E350.1	Nitrogen, as Ammonia	mg/l	0.2		0.2		150		190		48		43	
N	A2510B LAB SPECIFIC CONDUCTANCE umhos/cm		420		400		2600		4200		1600		1200		

Notes:

N = normal

F = filtered

FS = field sample

FD = field duplicate

U = not detected, value is the reporting limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Prepared by / Date:

Checked by / Date:

KJC 08/30/13

TDL 09/3/13

Table 2 Final Results Summary Data Validation Report

May 2013 Slurry Wall / Cap Groundwater and Surface Water

Olin Chemical Superfund Site Wilmington, Massachusetts

			Loc Name	ISC	1	ISC	·O2	197	:O3	PZ-1	edd.	PZ-1	7DD	PZ-1	0D	PZ-1	0D	SD-	17
			Field Sample ID	OC-IS	CO1	OC-IS	SCO2	OC-IS	SCO3	OC-PZ-1	6RRSW	OC-PZ-1	7RRSW	OC-DU	PSW	OC-PZ-	I8RSW	OC-S	D-17
			Field Sample Date	05/13	3/13	05/1	3/13	05/1	3/13	05/13/13		05/13/13		05/13/13		05/13	3/13	05/1	3/13
			QC Code	FS	3	F	S	F	S	F:	S	F	S	F)	FS	3	F	S
		Lab	Sample Delivery Group	480-38	209-1	480-38	3209-1	480-38	3209-1	480-38	209-1	480-38	209-1	480-38	209-1	480-38	80-38209-1 48		3209-1
Fra	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Т	SW6010	Aluminum	ug/l	150 、	J	380		93	J	1600		2200		180 、	J	160	J	2100	
Т	SW6010	Chromium	ug/l	11		64		5	U	340		520		12		12		500	
Т	SW6010	Sodium	ug/l	98000		120000		90000		130000		140000		98000		99000		140000	
F	SW6010	Aluminum	ug/l	63 .	J	130	J	200	U	300		740		99 .	J	78	J	700	
F	SW6010	Chromium	ug/l	6.2		24		5	U	130		290		6.9		7.1		280	
F	SW6010	Sodium	ug/l	97000		110000		88000		130000		140000		100000		100000		140000	
N	E300	Chloride	mg/l	150		140		180		160		170		160		160		180	
Ν	E353.2	Nitrate as N	mg/l	0.21		0.71		0.85		0.56		0.33		0.22		0.22		0.44	
N	E353.2	Nitrite as N	mg/l	0.021	J	0.023	J	0.05	U	0.023	J	0.02	J	0.021 、	J	0.02	J	0.05	U
N	E350.1	Nitrogen, as Ammonia	mg/l	28		37		1.4		40		41		27		28		47	
N	E300	Sulfate	mg/l	110		290		29		310		310		110		110		310	
Ν	A2510B	LAB SPECIFIC CONDUCTAR	NCE umhos/cm	820		1200		750		1200		1300		820		810		1300	

Notes:

N = normal

T = total (unfiltered)

F = filtered

FS = field sample

FD = field duplicate

U = not detected, value is the reporting limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Prepared by / Date:

Checked by / Date:

KJC 08/30/13

TDL 09/3/13

Validation Qualification Action Summary

Data Validation Report

May 2013 Slurry Wall / Cap Groundwater and Surface Water

Olin Chemical Superfund Site Wilmington, Massachusetts

		Analytical			Lab	Lab	Final	Final		
SDG	Lab Sample ID	Method	Field Sample ID	Parameter	Result	Qualifier	Result	Qualifier	Val Reason Code	Units
480-38141-1	480-38141-1	E350.1	OC-DUP GW	Nitrogen, as Ammonia	0.076		0.076	J	FD	mg/l
480-38147-1	480-38147-3	E350.1	OC-GW-34SR-XXX	Nitrogen, as Ammonia	0.15		0.15	J	FD	mg/l

 Units:
 Validation Reason Codes:
 Prepared by / Date:
 KJC 08/30/13

 mg/l = milligram per liter
 FD = Field Duplicate limit exceeded.
 Checked by / Date:
 TDL 09/3/13

Validation Qualifier:

J = value is estimated

Version 1.3, Oct 2011

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7

Reviewer/Date Chu Ricardi	10	1	17
	10	101	13
Lab Report # 480-38141-1			
Project # 610713 0016. 01.10			

			2913 Shurry Cap Well	
1.0	Laboratory Deliverable Requirements		, ,	
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received. ☐ Name of Laboratory ☐ Address ☐ Project ID ☐ Phone # Client Information: ☐ Name ☐ Address ☐ Client Co.	COLUMN TE FORM TO SAN INVANIANT TO	100-01-01 (1-0-10) 52 (1-0-0-1) (1-0-0-1)	
ACTIO	ON: If no, contact lab for submission of missing or illegible information.			
	1.2 Laboratory Report Certification Statement	Yes [1 No [] N/A []	Comments:	
Does th	ne laboratory report include a completed Analytical Report Certification in the required	format?		
4 <i>CTIO</i>	N: If no, contact lab for submission of missing certification or certification with correct	format.		
	1.3 Laboratory Case Narrative:	Yes [] No [] N/A []	Comments:	
	☐ Narrative serves as an exception report for the project and method QA/QC perfon the	ormance.	des an explanation of each discrepancy	
		Certifica	ation Statement.	
4 <i>CTIO</i>	N: If no, contact lab for submission of missing or illegible information.			
	1.4 Chain of Custody (COC) copy present with all documentation completed	Yes No N/A	Comments:	
	NOTE: Olin receives and maintains the original COC.			
ACTIO	N: If no, contact lab for submission of copy of completed COC.			
		8		
:\Projec	ts\olinwilm\Data Validation\DV checklists\2011 Revisions\6010.doc	1 of 10		
		1 01 10		

1.5 Sample Receipt Information (Cooler Receipt Form present?):	es []	No []	N/A []	Comments:
Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?		-		
\square Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the sample temperature confirmed: must be 1° – 10° C.	the same da	ay as collec	tion, temperat	ure requirement does not apply).
\square Container type noted \square sample condition observed \square pH verified (where applicable) \square Field and la	ab IDs cross	s reference	d	
ACTION: If no, contact lab for submission of missing or incomplete documentation.				*
1.5.1 Were all samples delivered to the laboratory without breakage?	es 🗹 🗈	No [_]	N/A [_]	Comments:
1.5.2 Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	es []]	No 🗾	N/A [_]	Comments:
1.6 Sample Results Section: Was each of the following requirements supplied in the Yolaboratory report for each sample?	es 🔟 🛚	No [_]	N/A [_]	Comments:
☐ Clean-up method ☐ Analysis method ☐ Preparation method ☐	Dilution Fa Date of pressoils must b	eparation/e	10 % m xtraction/diges in dry weight	noisture or solids
ACTION: If no, contact lab for submission of missing or incomplete information.				
1.7 QA/QC Information: Was each of the following information supplied in the Young laboratory report for each sample batch?	es [_] 1	No [_]	N/A [_]	Comments:
720				

/		/						
☑ Meth	od blank	results	ies MS/MSD recoveries and RPDs	☐ Laboratory duplicat	e results (where applicable)			
ACTIO	N: If no,	contact lab for submission	n of missing or incomplete information.					
2.0	Holding	Times			/			
Have an	exceeded water an	d? Holding time for metal	ined from date of collection to date of a ls is 180 days from sample collection to ana	analysis, been Yes [_alysis for both] No [N/A]	Comments:		
NOTE:	List samp	oles that exceed hold time	with # of days exceeded on checklist					
ACTIO	N: If tec (UJ). If	chnical holding times are of grossly exceeded (2X hold	exceeded, qualify all positive results (J) and ding time) reject (R) all non-detect results.	ad non-detects				
3.0	Labora	tory Method	*		1			
	3.1	Was the correct labora	tory method used?	Yes [_	No NA	Comments:		
		Water Digestion Soil Digestion Metals	3005A or 3010A or 3020A 3050B 6010B or 200.7					
comp	ared to t	no, contact laborato the requested method. (variance.	ry to provide justification for metl Contact senior chemist to inform Clier	hod change nt of change				ug/L
	3.2	Are the practical quan ☐ SOW ☐ OAI	titation limits the same as those spec	ified by the Yes [] No [] N/A []	Comments:	Aluminum	RL PQL
NOTI		L SOW LI QAI	PP □ Lab □ MADEP atch the target list specified on the COC.					

6010.doc

		If no, evaluate variation with respect to sample matrix, preparation, dilution, c. If sample PQL is indeterminate, contact lab for explanation.					
	3.3	Are results present for each sample in the SDG?	Yes 🔽	No [_]	N/A [_]	Comments:	
ACTIO	ON: If n	o, check Request for Analysis to verify if method was ordered and COC to verify that it	t was sent, an	d contact la	b for resubmis	ssion of the missing data	
	3.4	If dilutions were required, were dilution factors reported?	Yes 🛂	No [_]	N/A [_]	Comments:	
ACTIO	ON: If n	o, contact the lab for submission.					
4.0	Meth	od Blanks					
	4.1	Is the Method Blank Summary present?	Yes 🗾	No [_]	N/A [_]	Comments:	
AC	ΓΙΟN:	If no, call the laboratory for submission of missing data.	100				
	4.2	Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples?	Yes 🔼	No [_]	N/A [_]	Comments:	
AC'	ΓΙΟΝ: led. Nar	If no, contact laboratory for justification. Consult senior chemist for action rate non-compliance.					
	4.3	Is the method blank less than the PQLs for all target elements?	Ves I 1	Natva	N/A F 3	Comments At 1	01 41 200
NOT sam		DEP requires the method blank to be matrix matched and digested with the	res []	No	N/A	Comments: Aluminu h	100 mg/L
	4.4 the fol	Do any method blanks have positive results for metals? Qualify data according to lowing:	Yes [_]	No 🗾	N/A []	Comments:	
	27%						

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the	e
PQL or the concentration reported if greater than the PQL.	

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5x th	e blank	value) and the associated samples and qualifiers.				
5.0	Labor	atory Control Standard	,			
	5.1	Was a laboratory control standard run with each analytical batch of 20 samples or less?	Yes [No [_]	N/A [_]	Comments:
ACT	ION:	Itarget, second source LCS is required by MADEP. Call laboratory for LCS form submittal. If data are not available, use judgement to evaluate data accuracy associated with that batch.	/			
	5.2	Is a LCS Summary Form present?	Yes [✓]	No []	N/A [_]	Comments:
ACT	ION: I	f no, contact lab for resubmission of missing data.				
	5.3 Sample Water	Is the recovery of any analyte outside of MADEP control limits? MADEP Type % Rec 80-120	Yes []	No [_]	N/A []	Comments:
	Soil	within Lab generated limits				
within	the batects r	If recovery is above the upper limit, qualify all positive sample results atch as (J). If recovery is below the lower limit, qualify all positive and esults within the batch as (J). If LCS recovery is <30%, positive and non-are rejected (R).				
						Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes No N/A Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes No N/A Comments:

NOTE: A full target, second source MS/MSD is required by MADEP.

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes No N/A Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes No No N/A Comments:

	MADEP	QAPP	
Sample Type	% Rec	% Rec	Method
Water	75-125	N/A	6010B
Water	N/A	70-130	200.7
Soil	75-125	75-125	6010B

NOTE:
$$%R = (SSR-SR) \times 100\%$$

Where: SSR = Spiked sample result SR = Sample result

SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags. ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J). Are any RPDs for MS/MSD recoveries outside of the QC limits? 6.5 **NOTE**: $RPD = S-D \times 100\%$ Where: S = MSD = MSD sample result Where: S = MS sample result (S+D)/2NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied. ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J). 7.0 **Laboratory Duplicate** 7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Yes [] No [V] N/A [] Duplicate Sample Form present? NOTE: MADEP refers to this sample as a "matrix duplicate". ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance. 7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits?

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > $5 \times RL$, RPD must be $\pm 20\%$	20
For aqueous results $< 5 \times RL$, RPD must be $\leq RL$	20
For soil/sediment results > $5 \times$ RL, RPD must be $\pm 35\%$	20
For soil/sediment results $< 5 \times RL$, RPD must be $\leq 2 \times RL$	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

- Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.
- Do any rinsate blanks have positive results? 8.2

NOTE: MADEP does not require the collection of rinsate blanks.

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

No [] N/A [] Comments: OC-DUD-GW WAS collected with from OC-GW-345R-XXX

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9.2 Were field duplicates collected per the required frequency?	Yes 💟	No [_]	N/A [_]	Comments:	
SOW □ QAPP (1 per 10) □ MADEP Option 1 (1 per 20) □ MADEP Option 3 (1 per 10) □					
9.3 Was the RPD \leq 50% for soils or waters? Calculate the RPD for all results and attach to this review.	Yes [V]	No [_]	N/A [_]	Comments:	
ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.					
10.0 Special QA/QC					
10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal.	Yes [_]	No [N/A [_]	Comments:	
ACTION: If results for both total and dissolved are $\geq 5x$ the PQL and the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than $5x$ the PQL and the difference exceeds $2x$ the PQL, flag both results as estimated (J)					

10.0	Application of Validation Qualifiers				
	Was any of the data qualified?	Yes [_]	No 🗸	N/A [_]	Comments
If so, ap	oply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in d	atabase.			

REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

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Version 3, October 2008

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date Thanks Longley	
Sr. Review/Date Chris Ricards 10/10	13
Lab Report # 480 - 38141-1	77.00
Project # 6/0 #30016.01.10	_
2Q13 SLURRY CAP WALL	

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

	not define criteria, QA/QC requirements will default to limits employed by the laboratory.						
1.0	Laboratory Deliverable Requirements						
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received.	Yes No No	N/A [_]	Comments:			
	☐ Name of Laboratory ☐ Address ☐ Project ID ☐ Phone # Client Information: ☐ Name ☐ Address ☐ Client Contact	Sample identification	on – Field and	Laboratory			
	Client Information:	(IDs must be cross-refe	renced)				
ACTIO	ON: If no, contact lab for submission of missing or illegible information.						
	1.2 Laboratory Report Certification Statement	Yes [] No []	N/A [_]	Comments:			
	Does the laboratory report include a completed Analytical Report Certification in the r	required format?					
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct t	format.					
	1.3 Laboratory Case Narrative:	Yes [1 No []	N/A [_]	Comments:			
	☐ Narrative serves as an exception report for the project and method QA/QC performance.		des an explana	ation of each discrepancy on th	те		
		Certification State	ement.				
ACTIO	N: If no, contact lab for submission of missing or illegible information.						
	1.4 Chain of Custody (COC) copy present with all documentation completed?	Yes [No [N/A []	Comments:			
	Does the laboratory report include copies of Chain of Custody forms containing all samples in	this SDG?					
	NOTE: Olin receives and maintains the original COC.						
ACTIO	N: If no, contact lab for submission of copy of missing completed COC.		3:				
	1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?	Yes No No	N/A []	Comments:			

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☑ Sample temperature	confirmed: must be $1^{\circ} - 10^{\circ}$ C. (If samples were sent by courier and delivered of	on the same d	lay as collect	ion, temperatu	re requirement does not apply).
	d ☐ Condition observed ☐ pH verified (where applicable) ☐ Field and lab II				1
ACTION: If no, conta	act lab for submission of missing or incomplete documentation.				
1.5.1	Were the correct bottles and preservatives used?	/			
Ammonia,-	1 Liter polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C	Yes [No [_]	N/A []	Comments:
Oil & Greas	e – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C				
Alkalinity –	1 Liter polyethylene/cool to 4°C				
Chemical On	xygen Demand – 50 mL polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C				
Chloride, pH	I, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C				
Nitrate/nitrit	re - H2SO4 to pH<2,cool to 4°C				9
Organic Car	bon – 500 mL amber glass bottle/HCl or H ₂ SO ₄ to pH<2,cool to 4°C				
Sulfide – 50	mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C				
Phenolics - I	H ₂ SO ₄ to pH<2,cool to 4°C				
Specific con	ductance, TDS, TSS – 100 mL polyethylene/cool to 4°C				
container/volume (if	inform senior chemist. Document justification for change in applicable), qualify positive and non-detect data (J) data if cooler 10°C. Rejection of data requires professional judgment				*
1.5.2	Were all samples delivered to the laboratory without breakage?	Yes 🗾	No [_]	N/A [_]	Comments:
1.5.3	Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes [_]	No 🗾	N/A [_]	Comments:
1.6 Sample report for	Results Section: Was the following information supplied in the laboratory each sample?	Yes 🔼	No [_]	N/A [_]	Comments:

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				524	
Field ID and Lab ID	Date and time collected Analysis method	☐ Analyst Initials ☐ Preparation method	☐ Dilution Factor☐ Date of preparation/extractio		Reporting lim
☐ Matrix	☐ Target analytes and concentrate	ations	☐ Units (soils must be reported	7	
ACTION: If no, contac	t lab for submission of missing or inco	omplete information.	*	,	
2	W				
1.7 QA/QC Int for each sample	Formation: Was the following inform batch?	nation provided in the laborat	tory report Yes No No	N/A [_] Comments:	
☐ Method blank results	LCS recoveries MS/MSD	recoveries and RPDs □ I	Laboratory duplicate results (where	applicable)	
ACTION: If no, contact	lab for submission of missing or inco	mplete information.			
2.0 <u>Holding Times</u>	*		Yes No No	N/A] Comments:	
Have any techn	ical holding times, determined from	date of collection to date of	analysis, been exceeded? The hol	ding times are as follows:	
	ammonia, chemical oxygen demand				
		, TDS, TSS = 7 days	pH = analyze immediately	Nitrate nitrogen as N = 4	8 hrs
Nitrite nit	rogen as N = 48 hrs Nitrate	+ Nitrite as N = 28 days			
NOTE: List san	nples that exceed hold time with # of	days exceeded on checklist			
	holding times are exceeded qualify a		es that are grossly exceeded (>2X	hold time) reject (R) all non-dete	ect results. Professiona
20 Y.		•	/		
3.0 Labora	tory Method		Yes No No	N/A Comments:	
3.1 Was the corr	rect laboratory method used?				
ACTION: If no, contact	lab to provide justification for method	change compared to the regi	uested method. Contact/senior cher	nist to inform Client of change or t	to request variance
	ations - State • at the state of the state	2 p	desired interior. Contacty Somor Green	most to inform Chefit of change of t	to request variance.
3.2 Are the ☑ QAPI	practical quantitation limits the P/IRSWP Lab?	same as those specified	by the Yes No	N/A [_] Comments:	AS
Note: The MAL	DEP QA/QC Guidelines do not yet l	ist PQLs for wet chemistry	analyses,		
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		1 420	J 01 9		

	therefore all criteria will default to values s define criteria, QA/QC requirements defa may also apply.	stipulated in the QAPP*. Where the Qault to limits employed by the lab**.	APP does not Other criteria				
	Ammonia* 🗖 = 0.1 mg/ L	Alkalinity** $\square = 1 \text{ mg/L}$	Bi	carbonate Alkalinity** [J = 1 mg/L	Carbonate Alkalinity** □ = 1	l mg/L
	Nitrate Nitrogen as N* □ = .05 mg/L	Nitrite Nitrogen as N* □ = .01 mg		hloride* 🗹 = 1 mg/L		Hardness $*\Box = 2 \text{ mg/L}$	
	Spec. Cond.** 🗹 3 umhos/cm	Total Organic Carbon** □ = 1 m	ıg/L C	oil & Grease* $\square = 5.5 \text{ m}$	g/L	Sulfate (EPA 300.0)* ==	2 mg/L
	COD:* Low – 20 mg/L	COD* High - 50 mg/L □	T	DS* □ = 10 mg/L		$TSS* \square = 5 \text{ mg/L}$	
	pH* \square < 2 to > 12	Phenolic - 0.01 mg/L				-	
	Other parameter(list)	PQL =	□ Source	of PQL =		8	
	Other parameter(list)	PQL =	☐ Source	of POL =	ñ		
ACTIO	ON: If no, evaluate change with respect to s						
	3.3 Are the appropriate parameter results ON: If no, check Request for Analysis to ver 3.4 If dilutions were required, were dilutio ON: If no, contact the lab for submission.	rify if method was ordered and COC to		Yes No No	o for resubmiss	ion of the missing data Comments:	
4.0	Method Blanks			Yes No No	N/A [_]	Comments:	
	4.1 Are the Method Blank Summaries pre	sent?					
ACTIC	ON: If no, call the laboratory for submission	of missing data.					
	4.2 Was a method blank analyzed for eac 20 or less?	ch analysis batch of wet chemistry field	d samples of	Yes No No	N/A [_]	Comments:	
ACTIC	ON: If no, document discrepancy in case na	rrative and contact lab for justification	n. Consult sen	ior chemist for action ne	eded.		

	4.3 Is th	ne method blank less than the PQL? (See Section 3.2 for PQLs).	Yes []	No 🚺	N/A [_]	, 1-00 100 100	m RL = 200 .
	4.4 Do accordin	any method blanks have positive results for wet chemistry parameters? Qualify data ng to the following:	Yes [_]	No 🔼	N/A [_]	Comments:	
	If the sa PQL or	mple concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the the concentration reported if greater than the PQL.					
	If the sa	imple concentration is $> 5 \times$ blank value, no qualification is needed.					
ACTIO qualifie	ACTION : If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.						
5.0	Labora	tory Control Standards					
	5.1	Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less?	Yes 🔼	No [_]	N/A []	Comments:	
ACTIO judgmen	N: If no nt to deter	, call laboratory for LCS form submittal. If data is not available, use professional mine qualification actions for data associated with the batch.					
	5.2	Is a LCS Summary Form present?	Yes 💹	No [_]	N/A [_]	Comments:	218
ACTIO	N: If no,	contact lab for resubmission of missing data.					
	5.3	Is any wet chemistry analyte LCS recovery outside the control limits?	Yes [_]	No 🗾	N/A [_]	Comments:	

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST

WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

LCS L	imits:							
	Total Organic Carbon** $\square = 80\text{-}120\%$ TDS** \square COD Low* $\square = 80\text{-}120\%$ COD Hi		Bicarbonate Alkalinity** $\square = 80-120\%$ TDS** $\square = 80-120\%$ COD High* $\square = 80-120\%$ Chloride* $\square = 80-120\%$	Carbonate Alkalinit Oil & Grease* □ = Nitrate Nitrogen Sulfate (EPA 300.0	= 80-120% as N**□ =	= 80-120%	Specific Conductivity Ammonia Nitrogen as Nitrite Nitrogen as pH* □ = 98-102%	s N* ⊠ = 80-120%
	Other	parameter(list)	%R =		☐ Rec Li	mits=		
	Other	parameter(list)	%R =		□ Rec Li	mits =		
			(MADEP has not yet defined LCS recove					
o.0 Matrix	<u>Matri</u> spikes	x Spikes may be collected at different f	qualify all positive sample results within the land non-detect results are rejected (R). Trequencies based on monthly, quarterly, can be compared to the comp					
	6.1		s analyzed? List project samples that were spi	iked.	/			
ACTIO	ON: If no	, contact senior chemist to see if a	my were specified.	Yes [_]	No []	N/A []	Comments:	
	6.2	Is the MS/MSD Recovery Form	-					
ACTIO		o, contact lab for resubmission of	_	Yes []	No []	N/A	Comments:	
CONT	6.3	matrix?	at the required frequency of 1 per 20 samp	les per Yes []	No []	N/A [Comments:	
ACTIO		ny matrix spike data is missing, ca				,		
	6.4	Are any wet chemistry analyte	spike recoveries outside of the QC limits?	Yes []	No []	N/A [Comments:	
							•	

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OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST

WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

	NOTE:	%R = SA	(SSR-SR)	x 100%	б			Who	ere:	SSR	=	Spiked	sample	result
		5/1		SA =	Spike added							SR	= Sampl	e result
	MS/MSD Recovery Li	<u>imits:</u>												
	Alkalinity* = NA		Bicarbo	nate Alkali	nity* = NA	Carbonate alk	alinity*	* = NA	Amm	onia* (L <i>A</i>	СНАТ	r) □ = 75	-125%	
	Chloride*(SM 4500 Cl)) □= 75-125%	Specific	c Conductiv	ity $* = NA$	Total Organic	Carbo	$n^* = NA$	TDS*	* = NA				
	Oil & Grease* = NA		COD L	ow* □ = 7:	5-125%	COD High* □] = 75-	-125%	Nitrate	e Nitroge	n as N*	* = 75	-125%	
	Nitrite Nitrogen as N**	□ = 75-125%	Hardne	ss* □ = 75	-125%	Sulfate (EPA	300.0)	* 🗆 = 75 - 125				TSS* =		
	Other parameter(list)				% R =			_ 🗆 Rec Li	imits =					
	* = Laboratory Limits	*	* = Olin QAPP	Limits (ot yet defined LC								
	NOTES: 1) If only one 2) If the MS/N	e of the recover MSD was perfo	ries for an MS/N ormed by the lab	MSD pair is coratory on	outside of the can non-project sa	ontrol limits, no qı mple, no qualifica	ualifica	ntion is necessa required.	ary. Use p	rofession	al judg	ment for	the MS/MS	D flags.
quanty j	N: MS/MSD flags only positive results as estima D recovery is < 30% and	ted (J). If the	recoveries of th	e MS and I	MSD are lower	than the lower cor	ntrol lir	e. If the recove mit but > 30%	eries of the	MS and both posit	MSD e	exceed the	upper cont on-detects (rol limit, J). If the
ACTIO evaluate	N: Laboratory control led, but no flags are applie	imits apply wh	en spiked samp	le results fa	ll within the no	ormal calibration ra	ange. I	f dilutions are	required	due to hi	gh sam	ple conce	ntrations, th	e data is
	6.5 Are any RPDs for M	//S/MSD recov	eries outside of	the QA/QC	limits?					,				
	NOTE : RPD = $\frac{S - D}{(S + D)}$			S result SD result		Yes		No []	N/A [√]	Com	ments:			
	MS/MSD RPD Limits	Ē												
	RPD ≤20													
									•					
7.0	Laboratory Duplicate													
	Are the RPDs for the la	aboratory dupl	icates <20% unl	less otherw	ise specified be	·low? Yes		No []	N/A []	/ Com	ments:			
									, —					

ACTIC	N: If the RPD is greater than specified limits, qualify all results for that analyte as estimated	(J).			į.	
	pH* \square = 3% Specific Conductivity * \square = 5% TSS** \square = 6%		!	TDS** □ = 69	%	
8.0	Sampling Accuracy					
The m	ajority of ground water samples are collected directly from a tap, process stream, or edicated tubing. Rinse blanks will not be collected.					
	8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.	Yes [_]	No [N/A [_]	Comments:	
	8.2 Do any rinsate blanks have positive results?	Yes []	No []	N/A	Comments:	
ACTIO	N. Evaluate ringete regults us blank regults to determine if		1 70			
ACII	ON: Evaluate rinsate results vs. blank results to determine if contaminant may be lab If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PC					ble below.
	If the sample concentration is $> 5 \times$ blank value, no qualification is needed.	2 0, 11,0 00,10	omation rep	ortou ii grouto	a didir die 1 QL.	
NOTE:	MADEP does not require the collection of rinsate blanks.					
0.0	Field Duplicates					
	9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.	Yes [V]	No [_]	N/A [_]	Comments:	
OAl	9.2 Were field duplicates collected per the required frequency? PP/IRSWP MADEP Option 1(1 per 20) MADEP Option 3 (1 per 10)	Yes 🗾	No [_]	N/A [_]	Comments:	
4.11	9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review.	Yes [_]	No 🚺	N/A [_]	Comments: Ammina	RPO=65.4867

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VALIDATION REPORT 480-38387-1

FIELD DUPLICATE RPD ASSESSMENT

MAY 2013

OLIN CALCIUM SULFATE LANDFILL GROUNDWATER

Sample ID	Analyte	Orig Conc. (µg/L) Q	DUP Conc. (µg/L) Q	RPD
OC-DUP GW	Chromium	1.9 J	1.8 J	5.405405
	Aluminum	200 U	200 U	0
	Chloride	2.2	2.3	4.44444
	Sulfate	7.8	7.9	1.273885
	Ammonia	0.15	0.076	65.48673
	Specific Conductance	64	64	0
				#DIV/0!
	,			#DIV/0!

OC-Dup-GN is the deplicate sample for OC-GW-34SR-XXX

See LAB Report 480-38147-1 for critical people results

Client Sample Results

Client: Olin Corporation

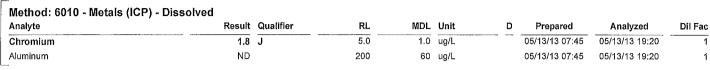
Project/Site: Olin Chemical Groundwater Quarterly

TestAmerica Job ID: 480-38141-1

Client Sample ID: OC-DUP GW

Date Collected: 05/09/13 12:00 Date Received: 05/11/13 06:00 Lab Sample ID: 480-38141-1

Matrix: Ground Water



General Chemistry	- "					_			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2.3		0.50	0.28	mg/L			05/14/13 15:02	1
Sulfate	7.9		2.0	0.35	mg/L			05/14/13 15:02	1
Ammonia	0.076	J	0.020	0.0090	mg/L			05/13/13 16:51	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	64		1.0	1.0	umhos/cm			05/16/13 02:30	1

Client Sample ID: OC-GW-78S-XXX

Date Collected: 05/09/13 14:55

Lab Sample ID: 480-38141-2

Matrix: Ground Water

Date Received: 05/11/13 06:00

Method: 6010 - Metals (ICP) - Dissolved Analyte Result Qualifier RL. MDL Unit D Dil Fac Prepared Analyzed Chromium 2.9 J 5.0 1.0 ug/L 05/13/13 07:45 05/13/13 19:22 Aluminum ND 200 60 ug/L 05/13/13 07:45 05/13/13 19:22

General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	20		0.50	0.28	mg/L			05/14/13 16:13	1
Sulfate	490		20	3.5	mg/L			05/15/13 16:31	10
Ammonia	43		1.0	0.45	mg/L			05/14/13 16:30	50
Analyte	Result	Qualifier	RL	RL.	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	1400		1.0	1.0	umhos/cm			05/16/13 02:30	1

Client Sample ID: OC-GW-79S-XXX

Date Collected: 05/09/13 13:50

Lab Sample ID: 480-38141-3

Matrix: Ground Water

Date Collected: 05/09/13 13:50 Date Received: 05/11/13 06:00

Method: 6010 - Metals (ICP) - Dissolved Analyte Result Qualifier RL MDL Unit Prepared Analyzed Dil Fac Chromium 7.4 5.0 1.0 ug/L 05/13/13 07:45 05/13/13 19:24 Aluminum ND 200 60 05/13/13 07:45 05/13/13 19:24 ug/L 1

General Chemistry Analyte	Result	Qualifier	RL.	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	160		50	28	mg/L			05/15/13 16:41	100
Sulfate	1200		200	35	mg/L			05/15/13 16:41	100
Ammonia	120		2.0	0.90	mg/L			05/14/13 15:01	100
Analyte	Result	Qualifier	RĹ	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	3000		1.0	1.0	umhos/cm			05/16/13 02:30	. 1

ACTION: Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified?

Yes No N/A Comments: Annonia a 0.076 J for
Duplicate & 0.16 J
fut sample

See LAB report 480-38147-1

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 5 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

Longley, Thomas D.

From:

Mazzolini, Chris T

Sent:

Tuesday, July 30, 2013 11:03 AM Longley, Thomas D.

To:

Cc:

Chapman, David L; Chatterton, Kelly J

Subject:

Olin, Wilmington Sampling - May 2013 DUPS

Tom

Olin Sampling in May 2013:

Groundwater

OC-DUP-GW = OC-GW-34SR

Surface Water

OC-DUP-SW = OC-PZ18RSW

Let me know if you need anything else.

Thanks,

Chris

Christopher Mazzolini

AMEC Environment & Infrastructure, Inc.

2 Robbins Road, Westford, MA, 01886 Office 978-392-5392 / Cell 339-927-3796 Version 1.3, Oct 2011

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7

Reviewer/Date	8-5-13	Thomas	& D. longley
Sr. Review/Date	Chrs	Ricert	10/10/13
Lab Report #	480-38	5147-1	.1.12
Project # 6/0	07/3 001	6.01.10	
20	/3	Shura W	uc.

					29 13	Shurry Wall Caps
1.0	<u>Laboratory Deliverable Requirements</u>					
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received.	Yes 📋	No [N/A [_]	Comments:	
	☑ Name of Laboratory ☑ Address ☑ Project ID ☑ Phone # Client Information: ☑ Name ☑ Address ☑ Client Cont	☐ Samp	le identifica	tion – Field an	nd Laboratory	
	Client Information:	tact (IDs must be	e cross-referei	nced)	
ACTIO	ON: If no, contact lab for submission of missing or illegible information.					
	1.2 Laboratory Report Certification Statement	Yes []	No []	N/A [_]	Comments:	
Does th	ne laboratory report include a completed Analytical Report Certification in the required f	format?				
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct for	ormat.	9.			
	1.3 Laboratory Case Narrative:	Yes [No []	N/A [_]	Comments:	
	☐ Narrative serves as an exception report for the project and method QA/QC perform the	rmance.	□ Nai	rative include	es an explanat	ion of each discrepancy
				Certificat	tion Statement.	
ACTIO	N: If no, contact lab for submission of missing or illegible information.		ğ			
	1.4 Chain of Custody (COC) copy present with all documentation completed	Yes 🔼	No [_]	N/A [_]	Comments:	
	NOTE: Olin receives and maintains the original COC.					
ACTIO	N: If no, contact lab for submission of copy of completed COC.					
1 .						
P:\Projec	ts\olinwilm\Data Validation\DV checklists\2011 Revisions\6010.doc		210			
		1	of 10			

1.	5 Sample R	Receipt Information (Cooler Receipt Form present?):	Yes 🔼	No [_]	N/A [_]	Comments:
	ere each of to the labora	the following tasks completed and recorded upon receipt of the sample(s) story?			75	
☑ Sample	temperature	confirmed: must be $1^{\circ} - 10^{\circ}$ C. (If samples were sent by courier and delivered	on the same	day as colle	ction, tempera	ture requirement does not apply).
☐ Contain	er type noted	d ☐ sample condition observed ☐ pH verified (where applicable) ☐ Field ar	nd lab IDs cro	oss referenc	ed	
ACTION:	If no, contact	ct lab for submission of missing or incomplete documentation.				æ
	1.5.1	Were all samples delivered to the laboratory without breakage?	Yes 🗾	No [_]	N/A [_]	Comments:
	1.5.2	Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes [_]	No 🚺	N/A [_]	Comments:
1.	6 Sample laboratory	Results Section: Was each of the following requirements supplied in the report for each sample?	Yes 🔟	No [_]	N/A [_]	Comments:
☐ Field I ☐ Clean-t ☐ Matrix	D and Lab I up method	Analysis method Preparation method	Dilution Date of pits (soils must	reparation/e	% rextraction/dige	noisture or solids
ACTION:	If no, conta	act lab for submission of missing or incomplete information.				
1. la	7 QA/QC boratory repo	Information: Was each of the following information supplied in the ort for each sample batch?	Yes [No [_]	N/A [_]	Comments:
		8				

6010.doc

☐ Metl	nod blank	results LCS recover	ies MS/MSD recoveries and RPDs	☐ Laboratory dup	licate resul	lts (where applicable)		
ACTIO	N: If no,	contact lab for submission	n of missing or incomplete information.					
2.0	Holding	<u>z Times</u>						
Have an		d? Holding time for meta	nined from date of collection to date of ls is 180 days from sample collection to an	analysis, been Ye	es 📋 🔝	No N/A N/A	Comments:	
NOTE:			with # of days exceeded on checklist					**
ACTIO	N: If tec (UJ). If	chnical holding times are grossly exceeded (2X hol	exceeded, qualify all positive results (J) adding time) reject (R) all non-detect results.	nd non-detects				w
3.0	Labora	ntory Method						
	3.1	Was the correct labora	tory method used?	Ye	es 🗾 🛚	No [_] N/A [_]	Comments:	
		Water Digestion Soil Digestion Metals	3005A or 3010A or 3020A 3050B 6010B or 200.7					
comp	pared to to orequest	the requested method. variance.	bry to provide justification for me Contact senior chemist to inform Clie	ent of change				
	3.2	Are the practical quar □ SOW □ QA	ntitation limits the same as those spe	cified by the $Y\epsilon$	es []	No N/A	Comments:	Aluminum RL = 200 eg/ Aluminum PQL = 100 es/L
NOT	E: Verify t	that the reported metals m	atch the target list specified on the COC.					0/

6010.doc

AC7	ΓΙΟΝ: sture, etc	If no, evaluate variation with respect to sample matrix, preparation, dilution, c. If sample PQL is indeterminate, contact lab for explanation.	,			9
	3.3	Are results present for each sample in the SDG?	Yes [No [_]	N/A []	Comments:
ACTIO	ON: If no	o, check Request for Analysis to verify if method was ordered and COC to verify that it	was sent, an	d contact la	b for resubmis	ssion of the missing data
	3.4	If dilutions were required, were dilution factors reported?	Yes []	No []	N/A []	Comments:
ACTIO	ON: If no	o, contact the lab for submission.				
4.0	Meth	od Blanks				
	4.1	Is the Method Blank Summary present?	Yes 🗾	No [_]	N/A [_]	Comments:
AC	TION:	If no, call the laboratory for submission of missing data.				
	4.2	Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples?	Yes 🔼	No [_]	N/A []	Comments:
		If no, contact laboratory for justification. Consult senior chemist for action rate non-compliance.				
	4.3	Is the method blank less than the PQLs for all target elements?	Ves []	No [1	N/A []	Comments: Adams 14 D1 = 2-22 44
NOT sam		DEP requires the method blank to be matrix matched and digested with the	100	1,0	.,,,	Comments: Alemina RL = 200 ug/
		Do any method blanks have positive results for metals? Qualify data according to lowing:	Yes [_]	No [V	N/A [_]	Comments:

6010.doc

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If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

= 5x the blank value) and the associated samples and qualifiers.						
5.0	Labor	atory Control Standard	,			
	5.1	Was a laboratory control standard run with each analytical batch of 20 samples or less?	Yes [No []	N/A []	Comments:
NOTE: A <u>full</u> target, second source LCS is required by MADEP. ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch. 5.2 Is a LCS Summary Form present? Yes No NA Comments:						
	5.2	Is a LCS Summary Form present?	Yes [No []	N/A []	Comments:
ACTION: If no, contact lab for resubmission of missing data.						
	5.3	Is the recovery of any analyte outside of MADEP control limits? MADEP	Yes []	No [V]	N/A []	Comments:
	<u>Sample</u> Water	e Type				
	Soil	within Lab generated limits				
		If recovery is above the upper limit, qualify all positive sample results				
non-d	letects r	atch as (J). If recovery is below the lower limit, qualify all positive and esults within the batch as (J). If LCS recovery is <30%, positive and non-are rejected (R).				
						Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes No NA Comments: OC-GW-34D-XXX was also collected for MS/MSD

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes No N/A Comments:

NOTE: A full target, second source MS/MSD is required by MADEP.

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes No N/A Commen

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [] No [] N/A [] Comments:

	MADEP	QAPP	
Sample Type	% Rec	% Rec	Method
Water	75-125	N/A	6010B
Water	N/A	70-130	200.7
Soil	75-125	75-125	6010B

NOTE:
$$\%R = (SSR - SR) \times 100\%$$

Where: SSR = Spiked sample result

SR = Sample result

SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags. ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J). Yes No No N/A Comments: 6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? **NOTE**: $RPD = S-D \times 100\%$ Where: S = MS D = MSD sample result Where: S = MS sample result (S+D)/2NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied. ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J). 7.0 Laboratory Duplicate 7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Yes [] No [] N/A [] Duplicate Sample Form present? NOTE: MADEP refers to this sample as a "matrix duplicate". ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance. 7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits?

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > $5 \times RL$, RPD must be $\pm 20\%$	20
For aqueous results < 5x RL, RPD must be ≤ RL	20
For soil/sediment results > $5 \times RL$, RPD must be $\pm 35\%$	20
For soil/sediment results $< 5 \times RL$, RPD must be $\leq 2 \times RL$	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. Do any rinsate blanks have positive results? 8.2

NOTE: MADEP does not require the collection of rinsate blanks.

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

No [] N/A [] Comments: OC-GW-345R-XXX simple
with OC-Dup-GiN being it's Associated
diplicate simple-see
Report # 480-38141-1 For Results
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9.2 Were field duplicates collected per the required frequency?	Yes No No N/A Comments:
SOW ☐ QAPP (1 per 10) 1 MADEP Option 1 (1 per 20) ☐ MADEP Option 3	3 (1 per 10) □
9.3 Was the RPD \leq 50% for soils or waters? Calculate the RPD for al attach to this review.	l results and Yes No No N/A Comments: See Report # 480-36141-1
ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sa	mple results if the RPD exceeds 50%.
10.0 Special QA/QC	
10.1 Were both total and dissolved metals analysis performed? dissolved metal concentration should not exceed that of the total meta	If so, the Yes No NA Comments: Just dissolved were called the dissolved
ACTION: If results for both total and dissolved are $\geq 5x$ the PQL and the concentration is 10% higher than the total, flag both results as estimated (J). dissolved concentrations are less than $5x$ the PQL and the difference excepQL, flag both results as estimated (J)	. If total and

10.0	Application of Validation Qualif

Was any of the data qualified?

Yes []	No []	N/A [1	Comments

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

Version 3, October 2008

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date Thomas D. Londey 8-513	
Sr. Review/Date Chr Review 10/10/12	3
Lab Report # 480 - 38147 - i	
Project # 6107 130016.01.10	-
2013, Thurry Wall Cap	

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0	Laboratory Deliverable Requirements								
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received.	Yes [_]	No [_]	N/A []	Comments:				
	☐ Name of Laboratory ☐ Address ☐ Project ID ☐ Phone # Client Information: ☐ Name ☐ Address ☐ Client Contact	Sample Sample		n – Field and L	aboratory				
	Client Information:	(IDs must b	e cross-refer	enced)					
ACTIO	ON: If no, contact lab for submission of missing or illegible information.								
2	1.2 Laboratory Report Certification Statement	Yes [No []	N/A []	Comments:				
	Does the laboratory report include a completed Analytical Report Certification in the	required forr	mat?						
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct	format.							
	1.3 Laboratory Case Narrative:	Yes []	No []	N/A [_]	Comments:				
	☐ Narrative serves as an exception report for the project and method QA/QC performance				tion of each discrepancy on the				
		Certi	fication State	ment.					
ACTIO	N: If no, contact lab for submission of missing or illegible information.								
	1.4 Chain of Custody (COC) copy present with all documentation completed?	Yes 🔟	No []	N/A []	Comments:				
	Does the laboratory report include copies of Chain of Custody forms containing all samples in	this SDG?							
	NOTE: Olin receives and maintains the original COC.								
ACTIO	N: If no, contact lab for submission of copy of missing completed COC.								
	1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?	Yes [_]	No [_]	N/A [_]	Comments:				

Sample temperature	confirmed: must be $1^{\circ}-10^{\circ}$ C. (If samples were sent by courier and delivered of	on the same d	lay as collect	ion, temperatu	re requirement does not apply).
Container type noted	d ☑ Condition observed ☐ pH verified (where applicable) ☐ Field and lab II	Ds cross refe	renced		
ACTION: If no, conta	act lab for submission of missing or incomplete documentation.				
1.5.1	Were the correct bottles and preservatives used?		,		
Ammonia,–	1 Liter polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C	Yes 🗾	No []	N/A []	Comments:
Oil & Greas	e – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C				
Alkalinity –	1 Liter polyethylene/cool to 4°C				
Chemical O	xygen Demand – 50 mL polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C				
Chloride, pH	I, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C				
Nitrate/nitrit	te - H2SO4 to pH<2,cool to 4°C				·
Organic Car	bon – 500 mL amber glass bottle/HCl or H ₂ SO ₄ to pH<2,cool to 4°C				
Sulfide – 50	mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C				
Phenolics - I	H ₂ SO ₄ to pH<2,cool to 4°C				
Specific con	aductance, TDS, TSS – 100 mL polyethylene/cool to 4°C				
container/volume (if	inform senior chemist. Document justification for change in applicable), qualify positive and non-detect data (J) data if cooler 10°C. Rejection of data requires professional judgment			·	
1.5.2	Were all samples delivered to the laboratory without breakage?	Yes 🔄	No [_]	N/A []	Comments:
1.5.3	Does the Cooler Receipt Form or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes [_]	No 🗾	N/A []	Comments:
1.6 Sample report for	Results Section: Was the following information supplied in the laboratory each sample?	Yes 🗾	No [_]	N/A []	Comments:

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WET CHEM.doc

			CV.	500	/
Field ID and Lab ID	Date and time collected Analysis method	Analyst Initials Preparation method	☐ Dilution Factor☐ Date of preparation/extraction	M mon/digestion clea	oisture or solids Reporting linn-up and analysis, where applicable
☑ Matrix	Target analytes and concentra	ations	Units (soils must be reported		, , , , , , , , , , , , , , , , , , , ,
ACTION: If no, contact la	ab for submission of missing or inco	emplete information.		, ,	
	r I				
1.7 QA/QC Infor for each sample ba	mation: Was the following informatch?	ation provided in the laborat	tory report Yes No No	N/A [_]	Comments:
7 X 4 - 111 - 1	Juga daman				
Method blank results	LCS recoveries MS/MSD	recoveries and RPDs	Laboratory duplicate results (where	applicable)	
ACTION: If no, contact lal	b for submission of missing or incom	mplete information.			
			/		
2.0 <u>Holding Times</u>			Yes No No	N/A]	Comments:
Have any technica	al holding times, determined from o	date of collection to date of	analysis, been exceeded? The hole	ding times are	as follows:
	nmonia, chemical oxygen demand,				
Alkalinity =		, TDS, TSS = 7 days	pH = analyze immediately		nitrogen as N = 48 hrs
Nitrite nitrog		+ Nitrite as N = 28 days			
NOTE: List sampl	les that exceed hold time with # of o	days exceeded on checklist			
The second control of	lding times are exceeded qualify r	77	es that are grossly exceeded (>2X	hold time) reje	ct (R) all non-detect results. Profession
3.0 Laborator	ry Method		Yes No No	N/A [_]	Comments:
3.1 Was the correc	t laboratory method used?				
ACTION: If no, contact lab	to provide justification for method	change compared to the reg	uested method. Contact senior shop	nist to inform C	lient of change or to request variance.
, , , , , , , , , , , , , , , , , , ,	to provide justification for memor	change compared to the requ	desied method. Contact-semoi chen	nst to inform C	ment of change of to request variance.
3.2 Are the p ☑ QAPP/II	practical quantitation limits the RSWP	same as those specified	d by the Yes No	N/A 🔏 T	Comments:
Note: The MADE	P QA/QC Guidelines do not yet li	ist PQLs for wet chemistry	analyses,		
WET CHEM.doc		Page	3 of 9		

therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply. Ammonia* $\Box = 0.1 \text{ mg/ L}$ Alkalinity** $\square = 1 \text{ mg/L}$ Bicarbonate Alkalinity** $\Box = 1 \text{ mg/L}$ Carbonate Alkalinity** $\square = 1 \text{ mg/L}$ Chloride* ■ 1 mg/L Nitrate Nitrogen as N* $\square = .05 \text{ mg/L}$ Nitrite Nitrogen as $N^* \square = .01 \text{ mg/L}$ Hardness $*\Box = 2 \text{ mg/L}$ Sulfate (EPA 300.0)* **□** = 2 mg/L Spec. Cond.** □ 3 umhos/cm Total Organic Carbon** $\square = 1 \text{ mg/L}$ Oil & Grease* $\square = 5.5 \text{ mg/L}$ COD:* Low -20 mg/LCOD* High - 50 mg/L □ $TDS* \square = 10 \text{ mg/L}$ TSS* $\square = 5 \text{ mg/L}$ $pH* \square < 2 \text{ to} > 12$ Phenolic - 0.01 mg/L Other parameter(list) Other parameter(list) ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation. Yes No N/A Comments: 3.3 Are the appropriate parameter results present for each sample in the SDG? ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data 3.4 If dilutions were required, were dilution factors reported? No[] N/A [] Comments: **ACTION:** If no, contact the lab for submission. 4.0 Method Blanks 4.1 Are the Method Blank Summaries present? **ACTION**: If no, call the laboratory for submission of missing data. 4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of No[] N/A[] 20 or less? ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

	4.3 Is th	e method blank less than the PQL? (See Section 3.2 for PQLs).	Yes 🚺	No [_]	N/A [] .	Comments:
		any method blanks have positive results for wet chemistry parameters? Qualify data ng to the following:	Yes [_]	No [V]	N/A []	Comments:
	If the sa PQL or	mple concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the the concentration reported if greater than the PQL.				
	If the sa	mple concentration is $> 5 \times$ blank value, no qualification is needed.				
ACTI(qualifie	ON: If an	ry blank has positive results, list all the concentrations detected and flagging level (fla	ngging level =	= 5 × blank	value) on the c	hecklist. List all affected samples and their
5.0	<u>Labora</u>	tory Control Standards				
	5.1	Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less?	Yes 🗾	No []	N/A []	Comments:
ACTIO udgmei	N: If no not to deter	, call laboratory for LCS form submittal. If data is not available, use professional mine qualification actions for data associated with the batch.				
	5.2	Is a LCS Summary Form present?	Yes 📋	No []	N/A []	Comments:
CTIO	N: If no,	contact lab for resubmission of missing data.				
	5.3	Is any wet chemistry analyte LCS recovery outside the control limits?	Yes []	No []	N/A []	Comments:

LCS Limits:

	Total Or	$y^{**} \square = 80-120\%$ ganic Carbon** $\square = 80-120\%$ $pw^* \square = 80-120\%$ $pw^* \square = 80-120\%$	Bicarbonate Alkalinity** \square = $80-120\%$ COD High* $\square = 80-120\%$ Chloride* $\square = 80-120\%$		Carbonate Alkalini Oil & Grease* □ Nitrate Nitrogen Sulfate (EPA 300	= 80-120% as N**□ =	80-120%	Specific Conductivity * Ammonia Nitrogen as N Nitrite Nitrogen as N pH* □ = 98-102%	N* 🗖 = 80-120%
	Other pa	rameter(list) A Mmonic	ī	_%R =9	9	Rec Lin	nits= <u>90</u>	-116	
	Other pa	rameter(list)		%R =		☐ Rec Lin	nits =		<u> </u>
			(MADEP has not yet define	ed LCS recove	ry limits for wet ch	emistry ana	lyses.)		
ACTIO within the	N: If receive batch a	overy is above the upper limit, s (J). If LCS recovery is <10%, Spikes	qualify all positive sample res non-detect results are rejected	sults within the b	oatch as (J). If reco	very is below	the lower lim	nit, qualify all positive a	nd no-detect results
		ay be collected at different f es. Confirm spike requirement			or task				
	6.1 V	Were project-specific MS/MSDs	s analyzed? List project samp	les that were spil	ked.			0//	2.5
ACTIO		contact senior chemist to see if a			Yes 🛂	No 🔲	N/A [_]	Comments: OC-Gu	1-340-XXX acs
ACTIO	6.2 N: If no,	Is the MS/MSD Recovery Forr contact lab for resubmission of			Yes [V]	No [_]	N/A [_]	Comments:	ymais samples
	6.3	Were matrix spikes analyzed matrix?	at the required frequency of	1 per 20 sampl	les per	No [_]	N/A [_]	Comments:	
ACTIO	N: If any	matrix spike data is missing, ca	ll lab for resubmission.						
	6.4	Are any wet chemistry analyte	spike recoveries outside of the	QC limits?	Yes [_]	No [1]	N/A []	Comments:	

	NOTE:	%R = SA	(SSR-SR) x	100% SA = Spike added	Carbonate alkalinity*	Where Ch la de	e: SSI 55R = 12 5R = 12	R = Spiked SR Sull-to 552 = 35	sample result = Sample result
	MS/MSD Recovery Li	mits:						SR = 35	Ammonia 0.15 5
	Alkalinity* = NA	9		e Alkalinity* = NA	Carbonate alkalinity*	* = NA	Ammonia*	(LACHAT) = 75	-125%
	Chloride*(SM 4500 Cl)	☑= 75-125%	Specific Co	nductivity * = NA	Total Organic Carbo	$n^* = NA$	$TDS^{**} = N$	IA.	
	Oil & Grease* = NA		COD Low*	□ = 75-125%	COD High* □ = 75-	125%	Nitrate Nitro	ogen as N** □ = 75	-125%
	Nitrite Nitrogen as N**	□ = 75 - 125%	Hardness*	□ = 75 - 125%					
	Other parameter(list)			% R =		_ □ Rec Lim	its =		
	* = Laboratory Limits			its (MADEP has not					
	NOTES: 1) If only one 2) If the MS/N	of the recover	ies for an MS/MSD	pair is outside of the cortory on a non-project sam	ntrol limits, no qualifica	ation is necessary			he MS/MSD flags.
qualify p	N: MS/MSD flags only positive results as estimated recovery is < 30% and	ted (J). If the	recoveries of the M	S and MSD are lower th	an the lower control lin	. If the recoveries that > 30%, or	es of the MS a qualify both po	and MSD exceed the ositive results and n	upper control limit, on-detects (J). If the
ACTIO evaluate	N: Laboratory control li d, but no flags are applied	imits apply wh d.	en spiked sample r	esults fall within the non	nal calibration range. I	f dilutions are re	equired due to	high sample conce	ntrations, the data is
	6.5 Are any RPDs for M	IS/MSD recov	eries outside of the	QA/QC limits?		/			
	NOTE : RPD = $\frac{S - D}{(S + D)}$)/2 x 100%	Where $S = MS$ res D = MSD	ult result	Yes [_]	No 📋 N	I/A [] C	Comments:	
	MS/MSD RPD Limits:								
	RPD ≤20								
7.0	<u>Laboratory Duplicate</u>						1		
	Are the RPDs for the la	boratory dupli	cates <20% unless	otherwise specified belo	ow? Yes [_]	No [_] N	I/A 🚺 C	Comments:	

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J). PH* = 3% Specific Conductivity * = 5% TSS** = 6%										
The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected. 8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. 8.2 Do any rinsate blanks have positive results? Yes No N/A Comments: ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below. If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL. If the sample concentration is > 5 × blank value, no qualification is needed. NOTE: MADEP does not require the collection of rinsate blanks. 9.1 Were field duplicates samples collected? Obtain a list of samples and their associated field duplicates. 9.2 Were field duplicates collected per the required frequency? QAPP/IRSWP MADEP Option 1(1 per 20) MADEP Option 3 (1 per 10) □ 9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review.	ACTIO	ON: If the RPD is greater than	specified limits, qualify all results for	that analyte as estimated (J).		ů.	1.0		
The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected. 8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. 8.2 Do any rinsate blanks have positive results? Yes No N/A Comments: ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below. If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL. If the sample concentration is > 5 × blank value, no qualification is needed. NOTE: MADEP does not require the collection of rinsate blanks. 9.1 Were field duplicates samples collected? Obtain a list of samples and their associated field duplicates. 9.2 Were field duplicates collected per the required frequency? Yes No N/A Comments: OAPP/IRSWP MADEP Option 1(1 per 20) MADEP Option 3 (1 per 10) D 9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review.		pH* □ = 3%	Specific Conductivity $*\Box = 5\%$	TSS** □ = 6%		1	ΓDS** □ = 69	%		
## Simple concentration is > 5 × blank value, no qualification is needed. ### Simple Comments: ### ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below. If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL. If the sample concentration is > 5 × blank value, no qualification is needed. ################################	8.0	Sampling Accuracy								
associated samples from the senior chemist. 8.2 Do any rinsate blanks have positive results? Yes No NA Comments: ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below. If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL. If the sample concentration is > 5 × blank value, no qualification is needed. NOTE: MADEP does not require the collection of rinsate blanks. 9.1 Were field duplicates 9.1 Were field duplicates samples collected? Obtain a list of samples and their associated field duplicates. 9.2 Were field duplicates collected per the required frequency? QAPP/IRSWP MADEP Option 1(1 per 20) MADEP Option 3 (1 per 10) MADEP Option 3 (1 per 10) MADEP Option 1 (1 per 20) MADEP Option 3 (1 per 10) MADEP Option 3 (1 per 1	The m	ajority of ground water sam edicated tubing. Rinse blan	aples are collected directly from a lks will not be collected.	a tap, process stream, or						
Yes No NA Comments: ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below. If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL. If the sample concentration is > 5 × blank value, no qualification is needed. NOTE: MADEP does not require the collection of rinsate blanks. 9.1 Were field duplicates 9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. 9.2 Were field duplicates collected per the required frequency? 9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. Yes No NA Comments: Accomments: A		8.1 Were rinsate blanks coll associated samples from the s	lected? Prior to evaluating rinsate senior chemist.	blanks, obtain a list of the	Yes [_]	No [V]	N/A [_]	Comments:		
If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL. If the sample concentration is > 5 × blank value, no qualification is needed. NOTE: MADEP does not require the collection of rinsate blanks. 9.1 Were field duplicates 9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. 9.2 Were field duplicates collected per the required frequency? 9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. Yes No NA Comments: Accomments: Accomme		8.2 Do any rinsate blanks have	ve positive results?	¥	Yes []	No []	N/A [Comments:		
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9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. 9.2 Were field duplicates collected per the required frequency? 9.2 Were field duplicates collected per the required frequency? 9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. 9.4 Ves □ No □ N/A □ Comments: Yes □ No □ N/A □ Comments: Yes □ No □ N/A □ Comments:	VOTE:	MADEP does not require the	he collection of rinsate blanks.	6						
QAPP/IRSWP □ MADEP Option 1(1 per 20) □ MADEP Option 3 (1 per 10) □ 9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. Yes □ No □ N/A □ Comments: No □ N/A □ Comments: No □ N/A □ Comments:	0.0	9.1 Were field duplicate s	amples collected? Obtain a list of sa	amples and their associated	Yes [V]	No X	N/A [_]	Comments:	See	480-38141-1
9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. Yes \[\] No \[\] N/A \[\] Comments:		9.2 Were field duplicates col	llected per the required frequency?		Yes [No [_]	N/A	Comments:		
attach to this review.	QA	PP/IRSWP □ MADEP Op	tion 1(1 per 20) ☐ MADEP O	ption 3 (1 per 10) □		1	1 lek	6 ~		
AMANONIA ROD=6	an.		waters≤ 50% for soils? Calculate t	the RPD for results and	Yes []	No [1]	N/A []	Comments:	Augus	_
									AMAROX	via RPD=65+

Client Sample Results

Client: Olin Corporation

Specific Conductance

Analyte

Specific Conductance

Project/Site: Olin Chemical Groundwater Semi-annual

TestAmerica Job ID: 480-38147-1

Lab Sample ID: 480-38147-1

Matrix: Water

05/16/13 02:30

Client Sample ID: OC-MP-2PORT13-XXX Date Collected: 05/09/13 10:10

Method: 6010 - Metals (ICP) - Dissolved

Date Received: 05/11/13 06:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	21		5.0	1.0	ug/L		05/13/13 07:45	05/13/13 18:55	1
Aluminum	120	J	200	60	ug/L		05/13/13 07:45	05/13/13 18:55	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	87		0.50	0.28	mg/L		S	05/14/13 16:44	1
Sulfate	22		2.0	0.35	mg/L			05/14/13 16:44	1
Ammonia	0.20		0.020	0.0090	mg/L			05/13/13 17:00	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac

Client Sample ID: OC-GW-34D-XXX Lab Sample ID: 480-38147-2

1.0

1.0 umhos/cm

Date Collected: 05/09/13 12:20 Matrix: Ground Water

Date Received: 05/11/13 06:00

Method: 6010 - Metals (IC Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	12		5.0	1.0	ug/L		05/13/13 07:45	05/13/13 18:57	1
Aluminum	ND		200	60	ug/L		05/13/13 07:45	05/13/13 18:57	1

General Chemistry Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	12		0.50	0.28	mg/L			05/14/13 16:54	1
Sulfate	35		2.0	0.35	mg/L			05/14/13 16:54	1
Ammonia	14		0.20	0.090	mg/L			05/13/13 18:40	10
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	210	-	1.0	1.0	umhos/cm			05/16/13 02:30	1

Client Sample ID: OC-GW-34SR-XXX Lab Sample ID: 480-38147-3 Matrix: Ground Water

Date Collected: 05/09/13 11:05 Date Received: 05/11/13 06:00

Result Qualifier

400

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	1.9	J	5.0	1.0	ug/L		05/13/13 07:45	05/13/13 19:13	1
Aluminum	ND		200	60	ug/L		05/13/13 07:45	05/13/13 19:13	1
General Chemistry Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2.2		0.50	0.28	mg/L			05/14/13 17:24	1
Sulfate	7.8		2.0	0.35	mg/L			05/14/13 17:24	1
Ammonia	7.8	WJ)	0.020	0.0090	mg/L			05/13/13 17:03	1
O			120	13757	22000	1697	220000000000000000000000000000000000000	24.5.5 27-27/28	

RL

1.0

RL Unit

1.0 umhos/cm

Prepared

TestAmerica Buffalo

Analyzed

05/16/13 02:30

Dil Fac

ACTION:.	Qualify	data (J	for l	both sam	ple results	if	the RPD	exceeded.
----------	---------	---------	-------	----------	-------------	----	---------	-----------

Was	any	of	the	data	qua	lified?
-----	-----	----	-----	------	-----	---------

Yes No No NA Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

Ammin @ 0.076 J for Dup.

and 0.15 J for simple

See Lab Report 480-38141-1

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 5 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

Version 1.3, Oct 2011

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7

Reviewer/Date Thomas Londey		1
Gr. Review/Date (hns Ricardi 10	10	13
Lab Report # 480 - 37932-1	7	
Project # 6107/30016.01.10		20

1.0	Laboratory Deliverable Requirements		
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received. Name of Laboratory Address Project ID Phone # Client Information: Address Client Con		
	Client Information: Name Address Client Cor	ontact (IDs must be cross-referenced)	
ACTIO	ON: If no, contact lab for submission of missing or illegible information.		
	1.2 Laboratory Report Certification Statement	Yes [No] N/A] Comments:	
Does th	ne laboratory report include a completed Analytical Report Certification in the required	format?	
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct	t format.	
	1.3 Laboratory Case Narrative:	Yes [No] N/A [Comments:	
	☐ Narrative serves as an exception report for the project and method QA/QC perform the	formance. ☐ Narrative includes an explanation of each discrepancy	
		Certification Statement.	
ACTIO	N: If no, contact lab for submission of missing or illegible information.		
	1.4 Chain of Custody (COC) copy present with all documentation completed	Yes No No N/A Comments:	
	NOTE: Olin receives and maintains the original COC.		
ACTIO	N: If no, contact lab for submission of copy of completed COC.		
P:\Projec	ts\olinwilm\Data Validation\DV checklists\2011 Revisions\6010.doc	1 of 10	

1.5 Sample l	Receipt Information (Cooler Receipt Form present?):	Yes [V]	No []	N/A []	Comments:
Were each of into the labora	f the following tasks completed and recorded upon receipt of the sample(s) atory?	31. 7 3 ;	2 7 - 1 22		
☐ Sample temperature ☐ Container type noted	confirmed: must be $1^{\circ} - 10^{\circ}$ C. (If samples were sent by courier and delivered d \square sample condition observed \square pH verified (where applicable) \square Field at	on the same	day as colle	ection, tempera	ture requirement does not apply).
ACTION: If no, conta	act lab for submission of missing or incomplete documentation.				8
1.5.1	Were all samples delivered to the laboratory without breakage?	Yes 🗾	No [_]	N/A [_]	Comments:
1.5.2	Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes [_]	No [V]	N/A []	Comments:
1.6 Sample laborator	Results Section: Was each of the following requirements supplied in the y report for each sample?	Yes 📋	No [_]	N/A [_]	Comments:
Field ID and Lab Clean-up method Matrix	ID	Dilution Date of paits (soils mus	Factor preparation/ t be reported	% rextraction/diged in dry weigh	moisture or solids
ACTION: If no, cont	act lab for submission of missing or incomplete information.				
1.7 QA/QC laboratory rep	Information: Was each of the following information supplied in the port for each sample batch?	Yes []	No [_]	N/A [_]	Comments:

Method blank results		/					
2.0 Holding Times Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. NOTE: List samples that exceed hold time with # of days exceeded on checklist ACTION: If technical holding times are exceeded, qualify all positive results (I) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results. 3.0 Laboratory Method 3.1 Was the correct laboratory method used? Water Digestion 3005A or 3010A or 3020A Soil Digestion 3050B Metals 6010B or 200.7 ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance. 3.2 Are the practical quantitation limits the same as those specified by the Yes No N/A Comments:	☐ Method blank	k results	es MS/MSD recoveries and RPDs Lab	oratory duplicate re	sults (where applicable)		
Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. NOTE: List samples that exceed hold time with # of days exceeded on checklist ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results. 3.0 Laboratory Method 3.1 Was the correct laboratory method used? Water Digestion 3005A or 3010A or 3020A Soil Digestion 3050B Metals 6010B or 200.7 ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance. 3.2 Are the practical quantitation limits the same as those specified by the Yes No N/A Comments:	ACTION: If no	, contact lab for submission	of missing or incomplete information.				
Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. NOTE: List samples that exceed hold time with # of days exceeded on checklist ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results. 3.0 Laboratory Method 3.1 Was the correct laboratory method used? Water Digestion 3005A or 3010A or 3020A Soil Digestion 3050B Metals 6010B or 200.7 ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance. 3.2 Are the practical quantitation limits the same as those specified by the Yes No NA Comments:							
exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. NOTE: List samples that exceed hold time with # of days exceeded on checklist ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results. 3.0 Laboratory Method 3.1 Was the correct laboratory method used? Water Digestion 3005A or 3010A or 3020A Soil Digestion 3050B Metals 6010B or 200.7 ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance. 3.2 Are the practical quantitation limits the same as those specified by the Yes No N/A Comments:	2.0 Holdin	g Times					
ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results. 3.0 Laboratory Method 3.1 Was the correct laboratory method used? Water Digestion 3005A or 3010A or 3020A Soil Digestion 3050B Metals 6010B or 200.7 ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance. 3.2 Are the practical quantitation limits the same as those specified by the Yes No N/A Comments:	exceede	ed? Holding time for metals	ned from date of collection to date of analysis is 180 days from sample collection to analysis for	, been Yes [_] or both	No No N/A	Comments:	
3.0 Laboratory Method 3.1 Was the correct laboratory method used? Water Digestion 3005A or 3010A or 3020A Soil Digestion 305B Metals 6010B or 200.7 ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance. 3.2 Are the practical quantitation limits the same as those specified by the Yes No N/A Comments:	NOTE: List sam	ples that exceed hold time v	vith # of days exceeded on checklist				
3.1 Was the correct laboratory method used? Water Digestion 3005A or 3010A or 3020A Soil Digestion 3050B Metals 6010B or 200.7 ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance. 3.2 Are the practical quantitation limits the same as those specified by the Yes No N/A Comments: A Sow QAPP Lab MADEP	ACTION: If te (UJ). I	echnical holding times are en f grossly exceeded (2X hold	xceeded, qualify all positive results (J) and non-cing time) reject (R) all non-detect results.	detects			
Water Digestion 3005A or 3010A or 3020A Soil Digestion 3050B Metals 6010B or 200.7 ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance. 3.2 Are the practical quantitation limits the same as those specified by the Yes No N/A Comments: A SOW QAPP Lab MADEP	3.0 <u>Labor</u>	atory Method					
Soil Digestion 3050B Metals 6010B or 200.7 ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance. 3.2 Are the practical quantitation limits the same as those specified by the Yes No NA Comments: A SOW QAPP Lab MADEP	3.1	Was the correct laborate	ory method used?	Yes 🗾	No [N/A [Comments:	
compared to the requested method. Contact senior chemist to inform Client of change and to request variance. 3.2 Are the practical quantitation limits the same as those specified by the Yes No N/A Comments: A SOW QAPP Lab MADEP		Soil Digestion	3050B				
3.2 Are the practical quantitation limits the same as those specified by the Yes No NA Comments: A NOTE: Verify that the reported metals match the target list specified on the COC.	compared to	the requested method. Cost variance.	Contact senior chemist to inform Client of cl	hange			
NOTE: Verify that the reported metals match the target list specified on the COC.	3.2	Are the practical quant ☐ SOW ☐ QAP	itation limits the same as those specified b P □ Lab □ MADEP	by the Yes []	No N/A	Comments:	Aluminus
	NOTE: Verify	that the reported metals ma	tch the target list specified on the COC.				

		If no, evaluate variation with respect to sample matrix, preparation, dilution, c. If sample PQL is indeterminate, contact lab for explanation.					
	3.3	Are results present for each sample in the SDG?	Yes [V]	No [_]	N/A [_]	Comments:	6 samples
ACTIO	ON: If no	, check Request for Analysis to verify if method was ordered and COC to verify that it	was sent, an	d contact la	b for resubmis	ssion of the miss	ing data
	3.4	If dilutions were required, were dilution factors reported?	Yes [V]	No [_]	N/A [_]	Comments:	
ACTIO	ON: If no	, contact the lab for submission.					
4.0	Meth	od Blanks					
	4.1	Is the Method Blank Summary present?	Yes 🗾	No [_]	N/A [_]	Comments:	
AC	rion:	If no, call the laboratory for submission of missing data.					
	4.2	Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples?	Yes 🔼	No [_]	N/A [_]	Comments:	
		If no, contact laboratory for justification. Consult senior chemist for action rate non-compliance.					(%)
	4.3	Is the method blank less than the PQLs for all target elements?	Voc []	No. I	N/A F I	Comments:	
NOT sam		DEP requires the method blank to be matrix matched and digested with the	1es []	NO	IVA	Comments.	E
		Do any method blanks have positive results for metals? Qualify data according to owing:	Yes [_]	No 🗾	N/A [_]	Comments:	

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

		, r 1				
5.0	Labo	ratory Control Standard				
	5.1	Was a laboratory control standard run with each analytical batch of 20 samples or less?	Yes 🗾	, No []	N/A []	Comments:
ACT	ION:	target, second source LCS is required by MADEP. Call laboratory for LCS form submittal. If data are not available, use judgement to evaluate data accuracy associated with that batch.				
	5.2	Is a LCS Summary Form present?	Yes [No []	N/A []	Comments:
ACT	ION:	If no, contact lab for resubmission of missing data.				
	5.3 Samp	Is the recovery of any analyte outside of MADEP control limits? MADEP e Type Rec 80 400	Yes []	No [N/A []	Comments:
	Water	80-120				
	Soil	within Lab generated limits				
withi non-c	n the t letects	If recovery is above the upper limit, qualify all positive sample results eatch as (J). If recovery is below the lower limit, qualify all positive and results within the batch as (J). If LCS recovery is <30%, positive and nonseare rejected (R).				
						Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes No N/A Comments

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes No N/A Comments:

NOTE: A <u>full</u> target, second source MS/MSD is required by MADEP.

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes No N/A Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

	_				/
Yes [1	No [Ī	N/A [Comments:

	MADEP	QAPP	
Sample Type	% Rec	% Rec	Method
Water	<i>75-125</i>	N/A	6010B
Water	N/A	70-130	200.7
Soil	75-125	75-125	6010B

NOTE:
$$\%R = (SSR-SR) \times 100\%$$

Where: SSR = Spiked sample resultSR = Sample result

SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits?

Yes No No N/A Comments

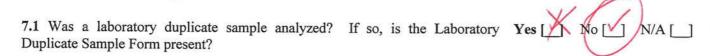
NOTE: RPD = S-D x 100% (S+D)/2

Where: S = MS sample result D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 <u>Laboratory Duplicate</u>



NOTE: MADEP refers to this sample as a "matrix duplicate".

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits?

Yes No No N/A Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > $5 \times$ RL, RPD must be \pm 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > $5 \times$ RL, RPD must be $\pm 35\%$	20
For soil/sediment results $< 5 \times RL$, RPD must be $\leq 2 \times RL$	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

9.0 <u>Field Duplicates</u>

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes _____ No ____ N/A ___ Comments

0.4 W. C.11.1 P							
9.2 Were field duplicates collected per the required frequency?	Yes []	No [_]	N/A	Comments:			
SOW □ QAPP (1 per 10) □ MADEP Option 1 (1 per 20) □ MADEP Option 3 (1 per 10) □			,				
9.3 Was the RPD \leq 50% for soils or waters? Calculate the RPD for all results and attach to this review.	Yes []	No [_]	N/A	Comments:			
ACTION : RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.							
10.0 Special QA/QC							
		/					
10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal.	Yes [_]	No 🔛	N/A []	Comments:			
ACTION: If results for both total and dissolved are $\geq 5x$ the PQL and the dissolved							
concentration is 10% higher than the total, flag both results as estimated (J). If total and							
dissolved concentrations are less than 5x the PQL and the difference exceeds 2x the				-			
PQL, flag both results as estimated (J)							

10.0	Application of Validation Qualifiers				
	Was any of the data qualified?	Yes []	No [N/A [_]	Comments
If so, ap	oply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in	database.			

REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

Version 3, October 2008

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date	Thomas	3 Longley A		,	1 _
Sr. Review/Date		Regide	10	101	13
Lab Report #	480-37	-932-1	- 1		
Project #	61071300	016.01.10		3.5.0	
20	213 Slux	ne Wall Com			

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

	not define effecta, QA/QC requirements will default to limits employed by the laboratory.				
1.0	Laboratory Deliverable Requirements				
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received.			N/A [_]	Comments:
	☑ Name of Laboratory ☐ Address ☑ Project ID ☑ Phone #	☐ Sampl	e identificatio	n – Field and I	aboratory
	☐ Name of Laboratory ☐ Address ☐ Project ID ☐ Phone # Client Information: ☐ Name ☐ Address ☐ Client Contact	(IDs must b	e cross-refer	renced)	attendere Peruna de realistation in
ACTIO	ON: If no, contact lab for submission of missing or illegible information.				
	1.2 Laboratory Report Certification Statement	Yes []	No []	N/A []	Comments:
	Does the laboratory report include a completed Analytical Report Certification in the re	required for	mat?		
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct for	format.	15.		
	1.3 Laboratory Case Narrative:	Yes []	No [_]	N/A [_]	Comments:
	☐ Narrative serves as an exception report for the project and method QA/QC performance.	. □ Na	rrative includ	les an explana	tion of each discrepancy on the
		Cert	ification State	ment.	
ACTIO	N: If no, contact lab for submission of missing or illegible information.				
	1.4 Chain of Custody (COC) copy present with all documentation completed?	Yes 🔼	No [_]	N/A [_]	Comments:
	Does the laboratory report include copies of Chain of Custody forms containing all samples in	this SDG?			
	NOTE: Olin receives and maintains the original COC.				
ACTIO	N: If no, contact lab for submission of copy of missing completed COC.		,		
	1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?	Yes [_]	No [_]	N/A []	Comments:

Sample te	mperature	confirmed: must be $1^{\circ}-10^{\circ}$ C. (If samples were sent by courier and delivered or	n the same d	ay as collecti	on, temperatu	re requirement does	not apply).
		Condition observed pH verified (where applicable) Field and lab ID					
ACTION: 1	f no, conta	ct lab for submission of missing or incomplete documentation.					
	1.5.1	Were the correct bottles and preservatives used?	/				
An	monia,–	1 Liter polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C	Yes [/	No []	N/A []	Comments:	
Oil	& Greas	e – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C					
All	calinity –	1 Liter polyethylene/cool to 4°C					
Ch	emical O	sygen Demand – 50 mL polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C					
Ch	loride, pH	I, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C					
Nit	rate/nitrit	e - H2SO4 to pH<2,cool to 4°C				•	
Organic Carbon – 500 mL amber glass bottle/HCl or H ₂ SO ₄ to pH<2,cool to 4°C							
Sul	fide – 50	mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C					
Phe	nolics - I	H₂SO₄ to pH<2,cool to 4°C					
Spe	ecific con	ductance, TDS, TSS – 100 mL polyethylene/cool to 4°C					
ACTION: container/vetemperature	olume (if	inform senior chemist. Document justification for change in applicable), qualify positive and non-detect data (J) data if cooler 10°C. Rejection of data requires professional judgment					
	1.5.2	Were all samples delivered to the laboratory without breakage?	Yes 🔟	No [_]	N/A [_]	Comments:	
	1.5.3	Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes []	No 🚺	N/A []	Comments:	
1.6	Sample report for	Results Section: Was the following information supplied in the laboratory each sample?	Yes 📋	No []	N/A []	Comments:	

WET CHEM.doc

Field ID and Lab ID Clean-up method	Date and time collected Analysis method	Analyst Initials Preparation method	☐ Dilution Factor☐ Date of preparation/extraction	% moisture or soli /digestion clean-up and anal	ids Reporting lim
☐ Matrix	☐ Target analytes and concentrate	ations	Units (soils must be reported		5 % 68
ACTION: If no, contact	lab for submission of missing or inco	omplete information.	S		
1.7 QA/QC Info for each sample l	ormation: Was the following informoatch?	nation provided in the labora	tory report Yes No No	N/A [_] Comments:	l .
Method blank results	LCS recoveries MS/MSD	recoveries and RPDs	Laboratory duplicate results (where a	applicable)	
ACTION: If no, contact	lab for submission of missing or inco	mplete information.			
2.0 Holding Times			Variation Nation	N/A _] Comments:	
2.0 Holding Times			Yes No No	N/A Comments:	i i
Have any technic	cal holding times, determined from	date of collection to date of	analysis, been exceeded? The hold	ling times are as follows:	
28 days = 3	ammonia, chemical oxygen demand	, chloride, organic carbon, o	oil & grease, specific conductance, t	total organic carbon and sul	Ifate
Alkalinity		, TDS, TSS = 7 days	pH = analyze immediately	Nitrate nitrogen as N	
Nitrite nitr	ogen as N = 48 hrs Nitrate	+ Nitrite as N = 28 days		i i kanan kanan kanan kanan kanan da kanan k	
NOTE: List sam	ples that exceed hold time with # of	days exceeded on checklist			
ACTION: If technical h judgment used to qualify s	olding times are exceeded qualify roils.	results (J). For water sample	es that are grossly exceeded (>2X l	nold time) reject (R) all nor	n-detect results. Professiona
20 7			/		
3.0 Laborat	ory Method		Yes Mo No	N/A [_] Comments:	1
3.1 Was the corre	ect laboratory method used?				
ACTION: If no, contact la	ab to provide justification for method	change compared to the req	uested method. Contact senior chem	ist to inform Client of change	ve or to request variance
	8 8	5 1	/	or to many chain of chang	,o or to request variance.
3.2 Are the ☑ QAPP	practical quantitation limits the TRSWP □ Lab?	same as those specified	d by the Yes No	N/A Comments:	20
Note: The MAD	EP QA/QC Guidelines do not yet l	ist PQLs for wet chemistry	analyses,		
WET CHEM.doc					
WEST CLIESVI. COC		Page	3 of 9		

	therefore all criteria will default to values sta define criteria, QA/QC requirements defau may also apply.			
	Ammonia* □ = 0.1 mg/ L	Alkalinity** $\square = 1 \text{ mg/L}$	Bicarbonate Alkalinity** □ = 1 mg/L	Carbonate Alkalinity** $\Box = 1 \text{ mg/L}$
	Nitrate Nitrogen as $N* \square = .05 \text{ mg/L}$	Nitrite Nitrogen as N* □ = .01 mg/	L Chloride* ▼ = 1 mg/L	Hardness $*\Box = 2 \text{ mg/L}$
	Spec. Cond.** ♥ 3 umhos/cm	Total Organic Carbon** □ = 1 mg/	$^{\prime}$ L Oil & Grease* $\square = 5.5 \text{ mg/L}$	Sulfate (EPA 300.0)* \blacksquare = 2 mg/L
	COD:* Low – 20 mg/L	COD* High - 50 mg/L □	$TDS* \square = 10 \text{ mg/L}$	TSS* $\square = 5 \text{ mg/L}$
	pH* □ <2 to > 12	Phenolic - 0.01 mg/L		attacher att. at his new Autor
	Other parameter(list)	PQL =	□ Source of PQL =	
	Other parameter(list)	PQL =	□ Source of PQL =	
ACTIO			isture, etc. If sample PQL is indeterminate, cont	
	3.3 Are the appropriate parameter results pon: If no, check Request for Analysis to verify 3.4 If dilutions were required, were dilution on the contact the lab for submission.	fy if method was ordered and COC to	Yes No No N/A werify that it was sent, and contact lab for resubs	mission of the missing data
4.0	Method Blanks		Yes No No N/A	Comments:
	4.1 Are the Method Blank Summaries pres	ent?		
ACTIO	N: If no, call the laboratory for submission	of missing data.		
	4.2 Was a method blank analyzed for each 20 or less?	analysis batch of wet chemistry field	samples of Yes No No N/A	Comments:
ACTIO	N: If no, document discrepancy in case narr	rative and contact lab for justification	Consult senior chemist for action needed	

	4.3 Is th	e method blank less than the PQL? (See Section 3.2 for PQLs).	Yes V	No [_]	N/A []	Comments:
		any method blanks have positive results for wet chemistry parameters? Qualify data g to the following:	Yes [_]	No 🗾	N/A []	Comments:
	If the sar PQL or	mple concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the the concentration reported if greater than the PQL.				
	If the sar	mple concentration is $> 5 \times$ blank value, no qualification is needed.				
ACTIO qualifier	ON: If an	y blank has positive results, list all the concentrations detected and flagging level (flag	gging level :	= 5 × blank v	value) on the cl	hecklist. List all affected samples and their
5.0	Labora	tory Control Standards				
	5.1	Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less?	Yes [_]	No []	N/A [_]	Comments:
ACTIO judgmer	N: If no	, call laboratory for LCS form submittal. If data is not available, use professional mine qualification actions for data associated with the batch.				
	5.2	Is a LCS Summary Form present?	Yes 💹	No []	N/A []	Comments:
ACTIO	N: If no,	contact lab for resubmission of missing data.				·
	5.3	Is any wet chemistry analyte LCS recovery outside the control limits?	Yes [_]	No 🗾	N/A [_]	Comments:

LCS Limits:

Total C	ity** $\square = 80-120\%$ Organic Carbon** $\square = 80-120\%$ Low* $\square = 80-120\%$ ess* $\square = 80-120\%$	TDS** $\Box = 80-120\%$ COD High* $\Box = 80-120\%$	Oil & Grease* □ = Nitrate Nitrogen	arbonate Alkalinity** $\square = 80\text{-}120\%$ Dil & Grease* $\square = 80\text{-}120\%$ Nitrate Nitrogen as N** $\square = 80\text{-}120\%$ Sulfate (EPA 300.0)* $\square = 80\text{-}120\%$		= $80-120\%$ Ammonia Nitro as N** \square = $80-120\%$ Nitrite Nitroge			ogen as N* \square = 80-120% en as N** \square = 80-120%	
Other 1	parameter(list)	%R =		☐ Rec Lin	nits=					
		%R=			•					
		(MADEP has not yet defined LCS recover	y limits for wet ch	emistry ana	lyses.)					
ACTION: If rewithin the batch	ACTION : If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).									
6.0 <u>Matri</u>	r Spikes									
		requencies based on monthly, quarterly, or ents for each set with the senior chemist.	r task							
6.1	Were project-specific MS/MSDs	analyzed? List project samples that were spik	ced.				•			
	, contact senior chemist to see if a	*	Yes []	No [V]	N/A []	Comments:				
6.2 ACTION: If no	Is the MS/MSD Recovery Form o, contact lab for resubmission of	•	Yes []	No []	N/A 🗾	Comments:				
6.3	Were matrix spikes analyzed matrix?	at the required frequency of 1 per 20 sample	es per Yes []	No []	N/A 🗾	Comments:				
ACTION: If an	y matrix spike data is missing, ca	ll lab for resubmission.								
6.4	Are any wet chemistry analyte	spike recoveries outside of the QC limits?	Yes []	No []	N/A [1]	Comments:				

	NOTE: %R = SA	(SSR-SR) x	100%		Where	e: S	SSR =	Spiked	sample result
	57.1		SA = Spike added					SK =	= Sample result
	MS/MSD Recovery Limits:								
	Alkalinity* = NA	Bicarbona	te Alkalinity* = NA	Carbonate alkalinity	* = NA	Ammonia	a* (LACHA	T) □ = 75-1	25%
	Chloride*(SM 4500 Cl) □= 75-125	5% Specific C	onductivity * = NA	Total Organic Carbo	$n^* = NA$	TDS** =	= NA	•	
	Oil & Grease* = NA	COD Low	* □ = 75-125%	COD High* □ = 75-		Nitrate Ni	itrogen as N	** 🗆 = 75-]	125%
	Nitrite Nitrogen as $N^{**} \square = 75-125$	5% Hardness*	° □ = 75-125%	Sulfate (EPA 300.0)	* □ = 75-125%		•		
	Other parameter(list)		%R =			-			
	* = Laboratory Limits	** = Olin QAPP Li	mits (MADEP has no						
	NOTES: 1) If only one of the reco	veries for an MS/MS erformed by the labor	D pair is outside of the coatory on a non-project sa	ontrol limits, no qualificant mple, no qualification is	ntion is necessary required.	v. Use profe	essional jud	gment for th	e MS/MSD flags.
qualify	N: MS/MSD flags only apply to the positive results as estimated (J). If the D recovery is < 30% and the sample	he recoveries of the I	MS and MSD are lower t	han the lower control li	e. If the recoveried mit but > 30%, o	es of the M qualify both	S and MSD positive re	exceed the usual sults and no	upper control limit, n-detects (J). If the
ACTIO evaluate	N: Laboratory control limits apply d, but no flags are applied.	when spiked sample	results fall within the no	rmal calibration range. I	f dilutions are re	equired due	to high sar	nple concent	trations, the data is
	6.5 Are any RPDs for MS/MSD rec	coveries outside of the	e QA/QC limits?			1			
	NOTE: RPD = $\frac{S - D}{(S + D)/2}$ x 100%		esult	Yes []	No [_] N	I/A [┪]	Comments	3:	
	MS/MSD RPD Limits:								
	RPD ≤20								
7.0	Laboratory Duplicate								
	Are the RPDs for the laboratory du	ıplicates <20% unles	s otherwise specified be	low? Yes [_]	No N	[/A [_]	Comments	: No	Diups

ACTIO	ON: If the RPD is greater	than specified limits, qualify all results for that	analyte as estimated (J)).					
	pH* □ = 3%	Specific Conductivity $*\Box = 5\%$	TSS** □ = 6%		•	TDS** □ = 69	⁄o		
8.0	Sampling Accuracy								
The m with d	ajority of ground wate edicated tubing. Rinse	r samples are collected directly from a tap blanks will not be collected.	, process stream, or				·		
	8.1 Were rinsate blank associated samples from	ss collected? Prior to evaluating rinsate blank in the senior chemist.	cs, obtain a list of the	Yes	No [V]	N/A []	Comments:		
	8.2 Do any rinsate blan	ks have positive results?		Yes [_]	No []	N/A [V]	Comments:		
ACTI	ON: Evaluate rinsate re	esults vs. blank results to determine if cont	aminant may be labor	ratory-deriv	ed. If not l	ab-related, q	ualify according	to the table below.	
		ation is $< 5 \times$ blank value, flag sample result nor						,	
	If the sample concentra	ation is $>$ 5 \times blank value, no qualification is near	eded.						
NOTE	: MADEP does not req	uire the collection of rinsate blanks.							
9.0	Field Duplicates								
	9.1 Were field dupli field duplicates.	cate samples collected? Obtain a list of sample	es and their associated	Yes []	No [N/A []	Comments:		
	9.2 Were field duplica	tes collected per the required frequency?		Yes []	No[]	N/A [·]	Comments:		
QA	PP/IRSWP □ <i>MADE</i>	P Option 1(1 per 20) ☐ MADEP Option	3 (1 per 10) □						
	9.3 Was the RPD \leq 309 attach to this review.	% for waters < 50% for soils? Calculate the I	RPD for results and	Yes []	No []	N/A 🚺	Comments:		

ACTION :. Qualify data (J) for both sample results if the RPD exceeded.		
Was any of the data qualified?	Yes [] No [N/A [] Comments:	

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

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MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

Version 1.3, Oct 2011

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7

Reviewer/Date Thomas Longle	7-29-13
Sr. Review/Date Chys Ric	and 10/10/13
Lab Report # 480-37930-1	1.1.
Project # 6/67/30016.01.1	0
2Q13, SLUTTY WALL CA	T

			2013, SLUTTY WALL CAP	
1.0	<u>Laboratory Deliverable Requirements</u>		W.	
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received.	Yes No No N/A	Comments:	
	☐ Name of Laboratory ☐ Address ☐ Project ID ☐ Phone #	Sample identification –	Field and Laboratory	
	Client Information:	ntact (IDs must be cross		
ACTIO	ON: If no, contact lab for submission of missing or illegible information.			
	1.2 Laboratory Report Certification Statement	Yes [No [] N/A	Comments:	
Does tl	ne laboratory report include a completed Analytical Report Certification in the required	format?		
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct	format.		
	1.3 Laboratory Case Narrative:	Yes [No [N/A	[_] Comments:	
	☐ Narrative serves as an exception report for the project and method QA/QC perfon the	ormance.	e includes an explanation of each dis	screpancy
	on the	C	Certification Statement.	
ACTIO	N: If no, contact lab for submission of missing or illegible information.			
	1.4 Chain of Custody (COC) copy present with all documentation completed	Yes No N/A	Comments:	
	NOTE: Olin receives and maintains the original COC.			
ACTIO	N: If no, contact lab for submission of copy of completed COC.			
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		1 of 10		

1.5	Sample F	Receipt Information (Cooler Receipt Form present?):	Yes [V]	No []	N/A []	Comments:
Wer into	e each of the labora	the following tasks completed and recorded upon receipt of the sample(s) tory?	,,,			
☑ Sample ten	nperature	confirmed: must be $1^{\circ} - 10^{\circ}$ C. (If samples were sent by courier and delivered	on the same	day as colle	ction, tempera	ture requirement does not apply).
Container t	type noted	sample condition observed D pH verified (where applicable) D Field an	d lab IDs cro	oss referenc	ed	
ACTION: If	no, conta	ct lab for submission of missing or incomplete documentation.				9
	1.5.1	Were all samples delivered to the laboratory without breakage?	Yes 🔟	No [_]	N/A [_]	Comments:
	1.5.2	Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes [_]	No 🗾	N/A [_]	Comments:
1.6	Sample laboratory	Results Section: Was each of the following requirements supplied in the report for each sample?	Yes [_]	No [_]	N/A [_]	Comments:
Field ID Clean-up Matrix	and Lab I method	D Date and time collected Analyst Initials Analysis method Target analytes and concentrations Unit	Dilution Date of p ts (soils must	Factor reparation/e be reported	% rextraction/dige	noisture or solids
		act lab for submission of missing or incomplete information.	,			
1.7 labor	QA/QC ratory repo	Information: Was each of the following information supplied in the ort for each sample batch?	Yes 🔄	No [_]	N/A [_]	Comments:
		×				

/	X.					
☑ Method blank results ☑ LCS recover	ries MS/MSD recoveries and RPDs Labor	oratory duplicate results (where applicable)			
ACTION: If no, contact lab for submission	n of missing or incomplete information.					
2.0 <u>Holding Times</u>						
Have any technical holding times, determ exceeded? Holding time for meta water and soil.	nined from date of collection to date of analysis, als is 180 days from sample collection to analysis for	been Yes No	N/A _	Comments:		
NOTE: List samples that exceed hold time	with # of days exceeded on checklist					
ACTION: If technical holding times are (UJ). If grossly exceeded (2X holding times)	exceeded, qualify all positive results (J) and non-d ding time) reject (R) all non-detect results.	etects				
3.0 <u>Laboratory Method</u>						
3.1 Was the correct labora	atory method used?	Yes 🚺 No	□ N/A □	Comments:		
Water Digestion Soil Digestion Metals	3005A or 3010A or 3020A 3050B 6010B or 200.7					
ACTION: If no, contact laborate compared to the requested method. and to request variance.	ory to provide justification for method che Contact senior chemist to inform Client of ch	ange				9
3.2 Are the practical quan	ntitation limits the same as those specified by	y the Yes [_] No	√ N/A []	Comments:	Aluminum	PL PQL 200 100
NOTE: Verify that the reported metals m	natch the target list specified on the COC.					1

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ACTION: moisture, e	If no, evaluate variation with respect to sample matrix, preparation, dilution, tc. If sample PQL is indeterminate, contact lab for explanation.				
3.3	Are results present for each sample in the SDG?	Yes 🚺	No []	N/A []	Comments:
ACTION: If r	no, check Request for Analysis to verify if method was ordered and COC to verify that in	t was sent, ar	d contact la	b for resubmis	ssion of the missing data
3.4	If dilutions were required, were dilution factors reported?	Yes 🗹	No []	N/A [_]	Comments:
ACTION: If r	no, contact the lab for submission.				
4.0 <u>Met</u> l	hod Blanks				·
4.1	Is the Method Blank Summary present?	Yes [V]	No []	N/A []	Comments:
ACTION:	If no, call the laboratory for submission of missing data.				
4.2	Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples?	Yes [_]	No [_]	N/A []	Comments:
	If no, contact laboratory for justification. Consult senior chemist for action wrate non-compliance.				
4.3	Is the method blank less than the PQLs for all target elements?	Yes [V]	No []	N/A []	Comments:
NOTE: MA samples	ADEP requires the method blank to be matrix matched and digested with the	_ •~		- " - "	
4.4 the fo	Do any method blanks have positive results for metals? Qualify data according to bllowing:	Yes []	No [N/A [_]	Comments:

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If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

=5x the	e blank	value) and the associated samples and qualifiers.				
5.0	Labor	atory Control Standard				
	5.1	Was a laboratory control standard run with each analytical batch of 20 samples or less?	Yes 🗹	No []	N/A []	Comments:
ACT	ION:	Itarget, second source LCS is required by MADEP. Call laboratory for LCS form submittal. If data are not available, use judgement to evaluate data accuracy associated with that batch.				
	5.2	Is a LCS Summary Form present?	Yes [No []	N/A []	Comments:
ACT	ION: I	f no, contact lab for resubmission of missing data.				
	5.3 Sample	Is the recovery of any analyte outside of MADEP control limits? **MADEP** **Type	Yes []	No 🛂	N/A []	Comments:
	Water	80-120				
withi non-c	n the ba letects r	within Lab generated limits If recovery is above the upper limit, qualify all positive sample results atch as (J). If recovery is below the lower limit, qualify all positive and esults within the batch as (J). If LCS recovery is <30%, positive and non-are rejected (R).				
						Comments:

6.0 <u>Matrix Spikes</u>

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes No N/A Comments

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes No N/A Comments:

NOTE: A full target, second source MS/MSD is required by MADEP.

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes No N/A Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes []	No []	N/A []	Comments:

	MADEP	QAPP	
Sample Type	% Rec	% Rec	Method
Water	75-125	N/A	6010B
Water	N/A	70-130	200.7
Soil	75-125	75-125	6010B

NOTE:
$$\%R = (SSR-SR) \times 100\%$$

Where: SSR = Spiked sample resultSR = Sample result

SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags. ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J). Are any RPDs for MS/MSD recoveries outside of the QC limits? 6.5 **NOTE**: $RPD = S-D \times 100\%$ Where: S = MS sample result D = MSD sample result NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied. ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J). 7.0 **Laboratory Duplicate** 7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Yes [V] No [] N/A [] Comments: Duplicate Sample Form present? NOTE: MADEP refers to this sample as a "matrix duplicate". ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance. 7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits?

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	MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD				
	For aqueous results > $5 \times$ RL, RPD must be $\pm 20\%$	20				
	For aqueous results < 5× RL, RPD must be ≤ RL	20				
	For soil/sediment results > $5 \times$ RL, RPD must be $\pm 35\%$	20				
	For soil/sediment results $< 5 \times RL$, RPD must be $\leq 2 \times RL$	20				
	TON : If the RPD exceeds the limits, qualify both positive timated and flag them J. Narrate non-compliance	results and non-detects				
8.0	Sampling Accuracy					
The ma	ajority of ground water samples are collected directly from a edicated tubing. Rinse blanks will not be collected.	a tap, process stream, or				
	8.1 Were rinsate blanks collected? Prior to evaluating rinsathe associated samples from the senior chemist.	ate blanks, obtain a list of	Yes [_]	No [N/A []	Comments:
	8.2 Do any rinsate blanks have positive results?		Yes []	No I	N/A [1	Comments:
NOT	E: MADEP does not require the collection of rinsate blanks.			* · · · ·		o ommittee.
	ION: Evaluate rinsate results against blank results to de be laboratory-derived. If results are not lab-related, qualify a					
	If the sample concentration is $< 5 \times$ blank value, flag sample result PQL or the concentration reported if greater than the PQL.	It non-detect "U" at the				
	If the sample concentration is $> 5 \times$ blank value, no qualification is	is needed.				
9.0	Field Duplicates			,		
	9.1 Were field duplicate samples collected? Obtain a list of samfield duplicates.	mples and their associated	Yes []	No [V]	N/A [_]	Comments:

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9.2 Were field duplicates collected per the required frequency?	Yes []	No []	N/A [V]	Comments:
SOW □ QAPP (1 per 10) □ MADEP Option 1 (1 per 20) □ MADEP Option 3 (1 per 10) □				
9.3 Was the RPD \leq 50% for soils or waters? Calculate the RPD for all results and attach to this review.	Yes [_]	No []	N/A 🗾	Comments:
ACTION : RPD must be ≤50% for soil and water. Qualify data (J) for both sample results in	f the RPD	exceeds 50	%.	•
10.0 Special QA/QC				
10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal.	Yes []	No 🗾	N/A []	Comments:
ACTION: If results for both total and dissolved are $\geq 5x$ the PQL and the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than $5x$ the PQL and the difference exceeds $2x$ the PQL, flag both results as estimated (J)				·

10.0	Application of Validation Qualifiers				
	Was any of the data qualified?	Yes []	No 🗾	N/A []	Comments:
If so, ap	oply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in	database.			

REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

Version 3, October 2008

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date	Thomas,	Londa	17-29	7-13	
Sr. Review/Date	Chus	(Proca	w,	0/10/) 3
Lab Report # 4	80-379.	30-1		TT'	, ,
Project # 6107	130016:	01.10			
2013	Shirry 1	WALL CA	P		

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

	•			
1.0	Laboratory Deliverable Requirements			
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received.	Yes No No	N/A [_]	Comments:
	☐ Name of Laboratory ☐ Address ☐ Project ID ☐ Phone #	☑ Sample identification	n – Field and I	Laboratory
	THE PROPERTY OF THE PROPERTY O	(IDs must be cross-refer		
ACTIO	ON : If no, contact lab for submission of missing or illegible information.			
	1.2 Laboratory Report Certification Statement	Yes [No []	N/A [_]	Comments:
	Does the laboratory report include a completed Analytical Report Certification in the re	equired format?		
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct for	ormat.		
	1.3 Laboratory Case Narrative:	Yes [/] No []	N/A [_]	Comments:
	☐ Narrative serves as an exception report for the project and method QA/QC performance.	☐ Narrative includ	les an explana	tion of each discrepancy on the
		Certification State		non or odon alcoropano, on the
ACTIO	N: If no, contact lab for submission of missing or illegible information.		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
	1.4 Chain of Custody (COC) copy present with all documentation completed?	Yes No No	N/A []	Comments:
	Does the laboratory report include copies of Chain of Custody forms containing all samples in	this SDG?		
	NOTE: Olin receives and maintains the original COC.			
ACTIO	N: If no, contact lab for submission of copy of missing completed COC.			
	1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?	Yes No No	N/A []	Comments:

☑ Sample to	emperature	confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered o	n the same d	ay as collecti	ion, temperatu	re requirement does not apply).
-		Condition observed pH verified (where applicable) Field and lab II				
ACTION:	If no, conta	ct lab for submission of missing or incomplete documentation.				
	1.5.1	Were the correct bottles and preservatives used?	/			
An	nmonia,-	1 Liter polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C	Yes [No [_]	N/A []	Comments:
Oi	l & Grease	e – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C				
Al	kalinity –	1 Liter polyethylene/cool to 4°C				
Ch	emical Ox	kygen Demand – 50 mL polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C				
Ch	loride, pH	I, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C				
Ni	trate/nitrit	e - H2SO4 to pH<2,cool to 4°C				
Or	ganic Carl	bon – 500 mL amber glass bottle/HCl or H ₂ SO ₄ to pH<2,cool to 4°C				
Su	lfide – 50	mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C				
Ph	enolics - I	H ₂ SO ₄ to pH<2,cool to 4°C				
Sp	ecific con	ductance, TDS, TSS – 100 mL polyethylene/cool to 4°C				
ACTION: container/v temperature	olume (if	inform senior chemist. Document justification for change in applicable), qualify positive and non-detect data (J) data if cooler 10°C. Rejection of data requires professional judgment				
	1.5.2	Were all samples delivered to the laboratory without breakage?	Yes [No [_]	N/A [_]	Comments:
	1.5.3	Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes [_]	No 🔼	N/A [_]	Comments:
1.6		Results Section: Was the following information supplied in the laboratory each sample?	Yes [No [_]	N/A [_]	Comments:

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					200		
Field ID and Lab ID	Date and time collected Analysis method	Analyst Initials Preparation method	Dilution Dilution			isture or solid n-up and analy	Reporting limits sis, where applicable
☐ Matrix	Target analytes and concentra	ations	☐ Units (soils must	be reported in	dry weight)		
ACTION: If no, contact l	ab for submission of missing or inco	omplete information.		7	D. 1970 U.S.		
			/	4			
1.7 QA/QC Infor for each sample be	rmation: Was the following informatch?	ation provided in the laborat	ory report Yes []	No [_]	N/A [_]	Comments:	
Method blank results	LCS recoveries MS/MSD	recoveries and RPDs	aboratory duplicate res	ults (where ap	pplicable)		
ACTION: If no, contact la	b for submission of missing or inco	mplete information.					
				,			
2.0 <u>Holding Times</u>			Yes []	No [V]	N/A]	Comments:	
Have any technic	al holding times, determined from	date of collection to date of	analysis, been exceeded	d? The holdi	ng times are a	s follows:	
	mmonia, chemical oxygen demand			*	_		ate
Alkalinity =		, TDS, TSS = 7 days	pH = analyze immed		10773	nitrogen as N	
Nitrite nitro	The Properties and the Propertie	+ Nitrite as N = 28 days	1	0701550.001 2 0			(0.4)(0.000)
	les that exceed hold time with # of	550					
	olding times are exceeded qualify a		s that are grossly exce	eded (>2X ho	old time) rejec	ct (R) all non-	-detect results. Professional
3.0 Laborato	ry Method		Yes [V]	No []	N/A [_]	Comments:	
3.1 Was the correct	et laboratory method used?						
ACTION: If no, contact la	to provide justification for method	I change compared to the req	uested method. Contact	senior chemis	st to inform Cl	ient of change	or to request variance.
3.2 Are the ☐ QAPP/	practical quantitation limits the RSWP	same as those specified	by the Yes [V]	No [_]	N/A [_]	Comments:	Ammonia: was reported a
Note: The MADE	P QA/QC Guidelines do not yet	list PQLs for wet chemistry	analyses,				Extendi of
WET CHEM.doc		Page	3 of 9				Jacobe w Jok.

	therefore all criteria will default to values define criteria, QA/QC requirements definay also apply.					
	Ammonia* 🗷 = 0.1 mg/ L	Alkalinity** $\square = 1 \text{ mg/L}$	Bicarbonate Alkalinity** □ = 1 mg/L	Carbonate Alkalinity** $\square = 1 \text{ mg/L}$		
	Nitrate Nitrogen as N* □ = .05 mg/L	Nitrite Nitrogen as N* □ = .01 mg/I	Chloride* □ = 1 mg/L	Hardness $*\Box = 2 \text{ mg/L}$		
	Spec. Cond.** 2 3 umhos/cm	Total Organic Carbon** □ = 1 mg/	L Oil & Grease* $\square = 5.5 \text{ mg/L}$	Sulfate (EPA 300.0)* ■ = 2 mg/L		
	COD:* Low – 20 mg/L	COD* High - 50 mg/L □	TDS* $\square = 10 \text{ mg/L}$	TSS* \square = 5 mg/L		
	pH* \square < 2 to > 12	Phenolic - 0.01 mg/L				
	Other parameter(list)	PQL =	□ Source of PQL =			
			☐ Source of PQL =			
ACTI	ON: If no, evaluate change with respect to s	sample matrix, preparation, dilution, moi	sture, etc. If sample PQL is indeterminate, contact l	ab for explanation.		
	3.4 If dilutions were required, were dilution	rify if method was ordered and COC to v	Yes No No N/A NA			
ACTI	ON: If no, contact the lab for submission.					
4.0	Method Blanks		Yes No No N/A	Comments:		
	4.1 Are the Method Blank Summaries pro	esent?				
ACTI	ON: If no, call the laboratory for submission					
	4.2 Was a method blank analyzed for ea 20 or less?	ch analysis batch of wet chemistry field s	ramples of Yes No No N/A	Comments:		
ACTI	ON: If no, document discrepancy in case na	arrative and contact lab for justification.	Consult senior chemist for action needed.			

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	4.3 Is th	e method blank less than the PQL? (See Section 3.2 for PQLs).	Yes []	No 🚺	N/A [_]	Comments:	Aluminum PRL	RL=200 mg,
		any method blanks have positive results for wet chemistry parameters? Qualify dang to the following:	ata Yes [_]	No 🔼	N/A [_]	Comments:		
	If the sa PQL or	mple concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the the concentration reported if greater than the PQL.						
	If the sa	mple concentration is $> 5 \times$ blank value, no qualification is needed.						
ACTI(ON: If an	by blank has positive results, list all the concentrations detected and flagging level	(flagging level	= 5 × blank	value) on the o	checklist. List	all affected sam	aples and their
5.0	Labora	tory Control Standards		,				
	5.1	Was a laboratory control standard (LCS) run with each analytical batch of a samples or less?	20 Yes [1]	No [_]	N/A [_]	Comments:		
		, call laboratory for LCS form submittal. If data is not available, use profession mine qualification actions for data associated with the batch.	nal					
	5.2	Is a LCS Summary Form present?	Yes 🔼	No []	N/A []	Comments:		*
ACTIO	N: If no,	contact lab for resubmission of missing data.						
	5.3	Is any wet chemistry analyte LCS recovery outside the control limits?	Yes []	No 🔼	N/A [_]	Comments:		

LCS Limits:

Alkalinity** $\square = 80-120\%$	Bicarbonate Alkalinity** □ = 80-120%	Carbonate Alkalinity** □ = 80-120%	Specific Conductivity $*\Box = 80/120\%$
Total Organic Carbon** □ = 80-120%	TDS** □ = 80-120%	Oil & Grease* □ = 80-120%	Ammonia Nitrogen as N* ☐ = 80-120%
COD Low* $\Box = 80-120\%$	COD High* □ = 80-120%	Nitrate Nitrogen as N**□ = 80-12	0% Nitrite Nitrogen as N** □= 80-120%
Hardness* □ = 80-120%	Chloride* ☑ = 80-120%	Sulfate (EPA 300.0)* ☑ = 80-120%	$pH* \square = 98-102\%$ TSS* NA
Other parameter(list) Other parameter(list) See ICP	%R =	98	80-120

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist. Were project-specific MS/MSDs analyzed? List project samples that were spiked. N/A Comments: ACTION: If no, contact senior chemist to see if any were specified. 6.2 Is the MS/MSD Recovery Form present? N/A [Comments: ACTION: If no, contact lab for resubmission of missing data. Were matrix spikes analyzed at the required frequency of 1 per 20 samples per 6.3 matrix? Comments: ACTION: If any matrix spike data is missing, call lab for resubmission. 6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits? Comments:

	NOTE: $%R = (S \times SA)$	SSR-SR) x	100%		Where	: S	SR	=	Spiked	sample = Sample	result
	SA		SA = Spike added						SR	= Sample	resuit
	MS/MSD Recovery Limits:										
	Alkalinity* = NA	Bicarbonate	Alkalinity* = NA	Carbonate alkalinity* = 1	NA	Ammonia	* (LAC	CHAT) 🗆 = 75	-125%	
	Chloride*(SM 4500 Cl) □= 75-125%	Specific Con	ductivity * = NA	Total Organic Carbon*	= NA	TDS** =	NA				
	Oil & Grease* = NA	COD Low*	□ = 75-125%	COD High* □ = 75-125	5%	Nitrate Ni	trogen	as N*	* □ = 75	-125%	
	Nitrite Nitrogen as N** \square = 75-125%	Hardness*] = 75-125%	Sulfate (EPA 300.0)* □] = 75-125%	$pH^* = N$	A		TSS* =	NA	
	Other parameter(list)		% R =		☐ Rec Limi	ts =					
	* = Laboratory Limits	Olin OAPP Limi	ts (MADEP has no	ot yet defined LCS recove	any limits for v	vet chemis	etny ar	nalvsa	(c)		
		O Q. II. T. Z.III.	is (iiiiibEi iido iid	n you domined 200 100010	ny minto for v	vet enerm	ou y ar	lalyse	3.)		
	NOTES: 1) If only one of the recoveries 2) If the MS/MSD was performed	for an MS/MSD ed by the laborate	pair is outside of the co ory on a non-project sai	ontrol limits, no qualification mple, no qualification is requalification is requalification.	n is necessary. uired.	Use profe	essiona	l judgı	ment for t	he MS/MSD	flags.
CTIO	N: MS/MSD flags only apply to the sampl			a or a second		s of the MS	S and N	ASD e	vceed the	unner contre	al limit
alify p	positive results as estimated (J). If the reco	overies of the MS	and MSD are lower t	han the lower control limit	but $> 30\%$, q	ualify both	positiv	ve resu	ilts and n	on-detects (J	. If the
S/MS	D recovery is < 30% and the sample is non-	-detect, the result	s are considered unusal	ble and flagged (R).							
CTIO aluate	N: Laboratory control limits apply when s d, but no flags are applied.	spiked sample re	sults fall within the no	rmal calibration range. If di	lutions are rec	quired due	to high	h samp	ole conce	ntrations, the	data is
	6.5 Are any RPDs for MS/MSD recoverie	s outside of the C	OA/OC limits?			/					
	NOTE : RPD = $\frac{S - D}{(S + D)/2}$ x 100% W		ılt	Yes [] N	No [_] N/	Ά [<u>ν</u>]	Comn	nents:			
	MS/MSD RPD Limits:										
	RPD ≤ 20										
	RPD ≤20										
N.	RPD ≤20 Laboratory Duplicate										
0		200/	oth amuiso au - : 5 - 3 l	love?		/	Comm			Laberatory	

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ACTIO	ON: If the RPD is	greater than specified limits, qualify all re	esults for that analyte as estim	nated (J).						
	pH* □ = 3%	Specific Conductivity *□	= 5% TSS** □ =	= 6%		$TDS^{**} \square = 6$	%			
3.0	Sampling Accu	racy								
		l water samples are collected directly. Rinse blanks will not be collected.	y from a tap, process strea	nm, or						
		e blanks collected? Prior to evaluating les from the senior chemist.	rinsate blanks, obtain a list	of the Yes [] No [V	N/A	Comments:			
	8.2 Do any rinsa	te blanks have positive results?		Yes [_] No []	N/A	Comments:			
ACTI	CTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.									
		ncentration is < 5 × blank value, flag sam					=			
	If the sample co	ncentration is $> 5 \times$ blank value, no quali	fication is needed.							
VOTE	i: MADEP does r	oot require the collection of rinsate bla	nks.							
0.0	Field Duplicate	<u>s</u>								
	9.1 Were fiel field duplicate	d duplicate samples collected? Obtain a ates.	list of samples and their asso	ves [J No [√]	/ N/A [_]	Comments:			
	9.2 Were field	duplicates collected per the required frequired frequire	nency?	Yes [1 No[]	N/A 🗾	Comments:			
QA	.PP/IRSWP □	MADEP Option 1(1 per 20) ☐ MA	DEP Option 3 (1 per 10) L		_ ' '	· /				
	9.3 Was the RPI attach to this re	$0 \le 30\%$ for waters $\le 50\%$ for soils? Ca eview.	culate the RPD for result	ts and Yes [_	No []	N/A	Comments:			

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.					
Was any of the data qualified?	Yes []	No []	N/A []	Comments:	
If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.					

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 5 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

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Version 1.3, Oct 2011

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7

Reviewer/Date	Chris	Ricarda	101	10	13
Lab Report #	480-3	38209-1			1
Project # 6/	07130	016001010			

			2013 Shurry Well Cap								
1.0	Laboratory Deliverable Requirements										
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received.	Yes No No N/A	Comments:								
	☐ Name of Laboratory ☐ Address ☐ Project ID ☐ Phone # Client Information: ☐ Name ☐ Address ☐ Client Co	☑ Sample identification – Field a	and Laboratory								
	Client Information:	ntact (IDs must be cross-refer	renced)								
ACTIC	N: If no, contact lab for submission of missing or illegible information.										
	1.2 Laboratory Report Certification Statement	Yes [No [] N/A []	Comments:								
Does th	oes the laboratory report include a completed Analytical Report Certification in the required format?										
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct	format.									
	1.3 Laboratory Case Narrative:	Yes [] No [] N/A []	Comments:								
	☐ Narrative serves as an exception report for the project and method QA/QC perfon the	ormance. ☐ Narrative inclu	des an explanation of each discrepancy								
	on the	Certific	ation Statement.								
ACTIO	N: If no, contact lab for submission of missing or illegible information.										
	1.4 Chain of Custody (COC) copy present with all documentation completed	Yes No No N/A	Comments:								
	NOTE: Olin receives and maintains the original COC.										
ACTIO	N: If no, contact lab for submission of copy of completed COC.										
P:\Project	ts\olinwilm\Data Validation\DV checklists\2011 Revisions\6010.doc	1 of 10									

1.5 Sample Receipt Information (Cooler Receipt Form present?):	Yes [V]	No[]	N/A []	Comments:
Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?	—			
\square Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered	on the same	day as colle	ction, tempera	ture requirement does not apply).
☐ Container type noted ☐ sample condition observed ☐ pH verified (where applicable) ☐ Field an	nd lab IDs cro	oss referenc	ed	
ACTION: If no, contact lab for submission of missing or incomplete documentation.				(4) 1
1.5.1 Were all samples delivered to the laboratory without breakage?	Yes 🗾	No [_]	N/A [_]	Comments:
1.5.2 Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes [_]	No 🔼	N/A [_]	Comments:
1.6 Sample Results Section: Was each of the following requirements supplied in the laboratory report for each sample?	Yes [_]	No [_]	N/A [_]	Comments:
Clean-up method	☐ Dilution☐ Date of parts (soils mus	reparation/		noisture or solids
ACTION: If no, contact lab for submission of missing or incomplete information.				
1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch?	Yes [_]	No [_]	N/A [_]	Comments:
*				

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/									
☐ Met	hod blank re	esults	ies	☐ Laboratory duplic	ate results	s (where applicable)			
ACTIO	N: If no, co	ontact lab for submission	of missing or incomplete information.						
2.0	Holding	Γimes							
Have a	ny technical exceeded? water and	Holding time for metal	ined from date of collection to date of s is 180 days from sample collection to an	analysis, been Yes nalysis for both	_] N	N/A _	Comments:		
NOTE:	List sample	es that exceed hold time	with # of days exceeded on checklist						
ACTIO	N: If techr (UJ). If gr	nical holding times are eossly exceeded (2X hold	exceeded, qualify all positive results (J) a ling time) reject (R) all non-detect results.	and non-detects					
3.0	Laborato	ory Method							
	3.1 V	Vas the correct laborate	tory method used?	Yes	✓ N	o [N/A []	Comments:		
	S	Vater Digestion oil Digestion Metals	3005A or 3010A or 3020A 3050B 6010B or 200.7						
comp		e requested method. (ry to provide justification for me Contact senior chemist to inform Clie						
NOT		□ SOW ☑ QAI	titation limits the same as those spe PP	ecified by the Yes] No	o N/A	Comments:	ALUMINUM RL= 20 PQL fe-Aluminum=	100 mg/

		If no, evaluate variation with respect to sample matrix, preparation, dilution, tc. If sample PQL is indeterminate, contact lab for explanation.							
	3.3	Are results present for each sample in the SDG?	Yes 🔼	No [_]	N/A [_]	Comments:			
ACTIO	ON: If n	o, check Request for Analysis to verify if method was ordered and COC to verify that it	t was sent, ar	nd contact la	b for resubmis	sion of the missing data			
	3.4	If dilutions were required, were dilution factors reported?	Yes 🔽	No [_]	N/A [_]	Comments:			
ACTIO	CTION: If no, contact the lab for submission.								
4.0	Metl	nod Blanks							
	4.1	Is the Method Blank Summary present?	Yes [No []	N/A [_]	Comments:			
ACT	ΓΙΟN:	If no, call the laboratory for submission of missing data.							
	4.2	Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples?	Yes 🗾	No [_]	N/A [_]	Comments:			
		If no, contact laboratory for justification. Consult senior chemist for action trate non-compliance.							
	4.3	Is the method blank less than the PQLs for all target elements?	Ves []	No I	N/A F 1	Comments: Aluminum RL= 20 mg, Aluminum PQL=100 mg,			
NOT sam		ADEP requires the method blank to be matrix matched and digested with the	103 []	110	1111	Alsemina PQL=100 mg			
	4.4 the fo	Do any method blanks have positive results for metals? Qualify data according to llowing:	Yes 🛂	No []	N/A [_]	Comments:			

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Striple Risults >5x; no guel. nudel - (2 red 4505)

	If the sa PQL or	imple concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the the concentration reported if greater than the PQL.			Sodice	m MB = 9015 (Red 4505
	If the sa	Result for Some Service ample concentration is > 5 × blank value no qualification is needed. For Some Service ample concentration is > 5 × blank value no qualification is needed.	sicon =	samples >5x Bi	SArghe: Lank Value	m MB = 901J (Setiem = 9200 in & 13000 in a:	TSCOT TSCOT TSCOT PE-KRRSW
ACTIO = 5x th	ON: For	r any blank with positive results, list all contaminants for each method blank value) and the associated samples and qualifiers.	including	the concen	tration detec	eted and the flagging level (flagging level
5.0	Labor	atory Control Standard					
	5.1	Was a laboratory control standard run with each analytical batch of 20 samples or less?	Yes [V]	No [_]	N/A	Comments:	
ACT	TION:	I target, second source LCS is required by MADEP. Call laboratory for LCS form submittal. If data are not available, use judgement to evaluate data accuracy associated with that batch.					
	5.2	Is a LCS Summary Form present?	Yes 🗾	No [_]	N/A []	Comments:	
ACT	TION: I	f no, contact lab for resubmission of missing data.					
	5.3	Is the recovery of any analyte outside of MADEP control limits? MADEP	Yes [_]	No 🗾	N/A [_]	Comments:	
	Sample Water	80-120 % Rec					
	Soil	within Lab generated limits					
ACT	TION:	If recovery is above the upper limit, qualify all positive sample results					
non-	detects r	atch as (J). If recovery is below the lower limit, qualify all positive and esults within the batch as (J). If LCS recovery is <30%, positive and non-					
		are rejected (R).					
						Comments:	
(010 1							

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes No NA Comments: Comments: Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes No N/A Comments:

NOTE: A <u>full</u> target, second source MS/MSD is required by MADEP.

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes No N/A Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [V]	No []	N/A [_]	Comments:

	MADEP	QAPP			
Sample Type	% Rec	% Rec	Method		
Water	75-125	N/A	6010B		
Water	N/A	70-130	200.7		
Soil	75-125	75-125	6010B		

OC-PZ-18RSW Shiph Result = 100000 ug/L for OC-Pt-1812SW, The MSO result of Rec = 137 which exceeds the 75-125% Rec.

NOTE: $%R = (SSR-SR) \times 100\%$

Where: SSR = Spiked sample result SR = Sample result

SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control NO qualification limits, no qualification is necessary. Use professional judgment for the MS/MSD flags. ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J). Are any RPDs for MS/MSD recoveries outside of the QC limits? 6.5 **NOTE**: $RPD = S-D \times 100\%$ Where: S = MS D = MSD sample result Where: S = MS sample result NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied. ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J). 7.0 **Laboratory Duplicate** LCS D provide 7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Yes [] Duplicate Sample Form present? RPD within linit: NOTE: MADEP refers to this sample as a "matrix duplicate". ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

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7.2 Is the RPD between the result for the laboratory duplicate sample and the

result for the parent sample outside of the OA/OC limits?

Yes No NA Comments:

Based on LCSD

MADEP Laboratory Duplicate Sample RPD Criteria:QAPP RPDFor aqueous results > $5 \times RL$, RPD must be $\pm 20\%$ 20For aqueous results < $5 \times RL$, RPD must be $\leq RL$ 20For soil/sediment results > $5 \times RL$, RPD must be $\pm 35\%$ 20For soil/sediment results < $5 \times RL$, RPD must be $\leq 2 \times RL$ 20	
ACTION: If the RPD exceeds the limits, qualify both positive results and non	n-detects
as estimated and flag them J. Narrate non-compliance	
8.0 Sampling Accuracy	
The majority of ground water samples are collected directly from a tap, process structure with dedicated tubing. Rinse blanks will not be collected.	ream, or
8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain the associated samples from the senior chemist.	n a list of Yes No No N/A Comments:
8.2 Do any rinsate blanks have positive results? NOTE: MADEP does not require the collection of rinsate blanks.	Yes No No N/A Comments:
ACTION: Evaluate rinsate results against blank results to determine if cont may be laboratory-derived. If results are not lab-related, qualify according to bel	

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

9.0 **Field Duplicates**

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated No [] N/A [] field duplicates.

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Yes [No [_]	N/A [_]	Comments:	-
Yes [☑]	No []	N/A [_]	Comments:	
if the RPD	exceeds 50	%.		
Yes [No [_]		u disshe	TOTA & DISSOLVED FOR ALLerminum, and Sodium
10% lu	year th	a ega	Dissau	Sodiem = 98000 and 40 of Sodiem = 10000
	Yes [V]	Yes No	Yes No No N/A See 25x PQL	Yes No No N/A Comments: if the RPD exceeds 50%. Yes No No N/A Comments: The axs he To TAT Dissan

10.0	Application of Validation Qualifiers	
	Was any of the data qualified?	Yes No No N/A Comments

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

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VALIDATION REPORT 480-38209-1

FIELD DUPLICATE RPD ASSESSMENT MAY 2013/SECOND QUARTER OLIN SLURRY WALL CAP SURFACE WATER

Sample ID	Analyte	Orig Conc. (µg/L) Q	DUP Conc. (µg/L) Q	RPD
OC-PZ-18RSW	Chromium - total	12	12	0
	Aluminum - total	180 J	160 J	11.76471
	Sodium - total	98000	99000	1.015228
	Chromium - dissolved	6.9	7.1	2.857143
	Aluminum - dissolved	99 J	78 J	23.72881
	Sodium - dissolved	100000 B	100000 B	0
				#DIV/0!

OC-DUP SW is the duplicate sample of OC-PZ-18RSW

Longley, Thomas D.

From:

Mazzolini, Chris T

Sent:

Tuesday, July 30, 2013 11:03 AM Longley, Thomas D.

To:

Cc:

Chapman, David L; Chatterton, Kelly J

Subject:

Olin, Wilmington Sampling - May 2013 DUPS

Tom

Olin Sampling in May 2013:

Groundwater

OC-DUP-GW = OC-GW-34SR

Surface Water

OC-DUP-SW = OC-PZ18RSW

Let me know if you need anything else.

Thanks,

Chris

Christopher Mazzolini

AMEC Environment & Infrastructure, Inc.

2 Robbins Road, Westford, MA, 01886 Office 978-392-5392 / Cell 339-927-3796 Version 3, October 2008

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date Thomas D. Longly 8-5-13	
Sr. Review/Date Chus Ricard 10/10/1	3
Lab Report # 480 - 38209 - 1	
Project # 6/0713 00/6.01.10	
2013 Shurry Will Cup	

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0	Laboratory Deliverable Requirements				
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received.	Yes 🔄	No [_]	N/A [_]	Comments:
	☐ Name of Laboratory ☐ Address ☐ Project ID ☐ Phone #	☐ Sample	e identificatio	n – Field and	Laboratory
	Client Information:		e cross-refei		5.7
ACTIO	ON: If no, contact lab for submission of missing or illegible information.				
	1.2 Laboratory Report Certification Statement Does the laboratory report include a completed Analytical Report Certification in the r	A-4-7-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	No [_]	N/A [_]	Comments:
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct t		nat.		
	1.3 Laboratory Case Narrative:	Yes [No [_]	N/A [_]	Comments:
	☐ Narrative serves as an exception report for the project and method QA/QC performance.		rrative includ	5	ation of each discrepancy on the
ACTIO	N: If no, contact lab for submission of missing or illegible information.				
	1.4 Chain of Custody (COC) copy present with all documentation completed?		No [_]	N/A [_]	Comments:
	Does the laboratory report include copies of Chain of Custody forms containing all samples in	this SDG?			
	NOTE: Olin receives and maintains the <i>original</i> COC.				
ACTIO	N: If no, contact lab for submission of copy of missing completed COC.				
	1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?	Yes 🗾	No []	N/A [_]	Comments:

Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply). Container type noted Condition observed pH verified (where applicable) Field and lab IDs cross referenced								
ACTION: 1	ACTION: If no, contact lab for submission of missing or incomplete documentation.							
	1.5.1	Were the correct bottles and preservatives used?	/	/				
An	nmonia,-	1 Liter polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C	Yes []	No [_]	N/A [_]	Comments:		
Oil	& Grease	e – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C						
All	kalinity –	1 Liter polyethylene/cool to 4°C						
Ch	emical Ox	tygen Demand – 50 mL polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C						
Ch	loride, pH	l, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C						
Nit	trate/nitrit	e - H2SO4 to pH<2,cool to 4°C				45		
Or	ganic Carl	oon – 500 mL amber glass bottle/HCl or H ₂ SO ₄ to pH<2,cool to 4°C						
Su	lfide – 50	mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C						
Pho	enolics - H	H ₂ SO ₄ to pH<2,cool to 4°C						
Sp	ecific con	ductance, TDS, TSS – 100 mL polyethylene/cool to 4°C						
ACTION: container/v temperature	ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment							
	1.5.2	Were all samples delivered to the laboratory without breakage?	Yes [_]	No [_]	N/A [_]	Comments:		
	1.5.3	Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes []	No [V]	N/A [_]	Comments:		
1.6	Sample report for	Results Section: Was the following information supplied in the laboratory each sample?	Yes [1]	No [_]	N/A [_]	Comments:		

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OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION

STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

				000		
Field ID and Lab ID Clean-up method	☐ Date and time collected ☐ Analysis method	Analyst Initials Preparation method	Dilution Factor Date of preparation/extraction	√	or solids E	Reporting limi
☐ Matrix	☐ Target analytes and concentra	tions	☑ Units (soils must be reported			
ACTION: If no, contact la	ab for submission of missing or inco	mplete information.	5 (c)			
	10					
1.7 QA/QC Infor for each sample ba	mation: Was the following information?	ation provided in the laborat	ory report Yes No No	N/A [] Com	ments:	
☐ Method blank results	LCS recoveries MS/MSD	recoveries and RPDs 🗆 L	aboratory duplicate results (where a	applicable)		
ACTION: If no, contact la	b for submission of missing or incor	mplete information.				
			/			
2.0 <u>Holding Times</u>			Yes No No	N/A] Com	ments:	
Have any technical	al holding times, determined from d	late of collection to date of a	analysis, been exceeded? The hold	ling times are as follo	ws:	
	nmonia, chemical oxygen demand,					
Alkalinity =		TDS, TSS = 7 days	pH = analyze immediately	553	en as N = 48 hrs	
Nitrite nitro	gen as N = 48 hrs Nitrate	+ Nitrite as N = 28 days		And a state of the first state of the state		
NOTE: List samp	les that exceed hold time with # of d	ays exceeded on checklist				
ACTION: If technical ho judgment used to qualify so	lding times are exceeded qualify reils.	esults (J). For water samples	s that are grossly exceeded (>2X l	nold time) reject (R)	all non-detect resu	lts. Professional
3.0 Laborato	ry Method		Yes [] No []	220 2 0		
J.O Laborato	ry Method		Yes [V] No [_]	N/A Comr	nents:	
3.1 Was the correct	et laboratory method used?					
ACTION: If no, contact lab	to provide justification for method	change compared to the requ	nested method. Contact senior chem	ist to inform Client of	change or to reque	est variance
				/	change of to reque	ot variance.
3.2 Are the p ☑ QAPP/I	practical quantitation limits the RSWP Lab?	same as those specified	by the Yes No	N/A Comr	nents:	
Note: The MADE	P QA/QC Guidelines do not yet li	st PQLs for wet chemistry	analyses,			
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	therefore all criteria will default to values st define criteria, QA/QC requirements defa may also apply.	ult to limits employed by the lab**.	Other criteria			
	Ammonia* □ = 0.1 mg/ L Nitrate Nitrogen as N* □ = .05 mg/L	Alkalinity** $\square = 1 \text{ mg/L}$	Bicarbonate Al	lkalinity** □	l = 1 mg/L	Carbonate Alkalinity** □ = 1 mg/L
	Nitrate Nitrogen as N* □ = .05 mg/L	Nitrite Nitrogen as N* ≡ .01 m	g/L (∅.∅5) Chloride* 🗹=	= 1 mg/L		Hardness $*$ □ = 2 mg/L
	Spec. Cond.** ☑ 3 umhos/cm	Total Organic Carbon** □ = 1 m	g/L Oil & Grease*	* □ = 5.5 m	g/L	Sulfate (EPA 300.0)* ☑ = 2 mg/L
*	COD:* Low – 20 mg/L	COD* High - 50 mg/L □	TDS* □ = 10	mg/L		$TSS* \square = 5 \text{ mg/L}$
	$pH* \square < 2 \text{ to} > 12$	Phenolic - 0.01 mg/L				S AND S ON S
	Other parameter(list)	PQL =	☐ Source of PQL =			
	Other parameter(list)	PQL =	☐ Source of PQL =			
ACTIO	N: If no, evaluate change with respect to sa		0.00			
	3.3 Are the appropriate parameter results poly: If no, check Request for Analysis to veri. 3.4 If dilutions were required, were dilution. N: If no, contact the lab for submission.	fy if method was ordered and COC to	verify that it was sent, and	d contact lab	N/A [_] for resubmissi	
4.0	Method Blanks		Yes [V]	No [_]	N/A [_]	Comments:
	4.1 Are the Method Blank Summaries pres	ent?				
ACTIO	N: If no, call the laboratory for submission	of missing data.				
	4.2 Was a method blank analyzed for each 20 or less?	analysis batch of wet chemistry field	samples of Yes [No [_]	N/A [_]	Comments:
ACTIO	N: If no, document discrepancy in case narr	rative and contact lab for justification	Consult senior chemist f	or action need	dad	

	4.3 Is the	e method blank less than the PQL? (See Section 3.2 for PQLs).	Yes []	No 🗹	N/A [_]	Comments:	Nitrite RL= 0.050 m
		any method blanks have positive results for wet chemistry parameters? Qualify data g to the following:	Yes []	No [<u>V</u>	N/A [_]	Comments:	
	If the sar PQL or	mple concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the the concentration reported if greater than the PQL.					
	If the sar	mple concentration is > 5 × blank value, no qualification is needed.					
ACTIO qualifier	ON: If an	y blank has positive results, list all the concentrations detected and flagging level (fla	ngging level	= 5 × blank v	ralue) on the c	hecklist. List	all affected samples and their
5.0	Labora	tory Control Standards				45	
		w F	/				
	5.1	Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less?	Yes 🔼	No []	N/A [_]	Comments:	
ACTIO judgmer	N: If no	, call laboratory for LCS form submittal. If data is not available, use professional mine qualification actions for data associated with the batch.					
	5.2	Is a LCS Summary Form present?	Yes 🔼	No []	N/A [_]	Comments:	. *
ACTIO	N: If no,	contact lab for resubmission of missing data.	30				
	5.3	Is any wet chemistry analyte LCS recovery outside the control limits?	Yes [_]	No [N/A [_]	Comments:	

			WEI CHEMISTRY FARAMET	EKS DI V	ARIOUS	METHODS	•			
LCS Li	mits:					*N			1	_
	Total O	ity** $\square = 80-120\%$ rganic Carbon** $\square = 80-120\%$ ow* $\square = 80-120\%$ ss* $\square = 80-120\%$	Bicarbonate Alkalinity** $\square = 80\text{-}120\%$ TDS** $\square = 80\text{-}120\%$ COD High* $\square = 80\text{-}120\%$ Chloride* $\square = 80\text{-}120\%$	Oil & O	Grease* □ : Nitrogen	ty** $\square = 80$ = 80-120% as N** $\square = 80$	= 80-120%	Ammonia Nit	fuctivity $*\Box = 80-120\%$ trogen as N* $\Box = 80-120\%$ gen as N** $\Box = 80-120\%$ 102% TSS* NA	
	Other pa	arameter(list)	%R =			□ Rec Li	mits=		2	
			%R =				7.5			
			(MADEP has not yet defined LCS recov							
. cmr							a a			
within t	he batch a	as (J). If LCS recovery is <10%,	qualify all positive sample results within the non-detect results are rejected (R).	e batch as (J). If recov	very is belov	v the lower lin	nit, qualify all p	oositive and no-detect resul	ts
6.0	Matrix	Spikes								
Matrix specific	spikes n	nay be collected at different f les. Confirm spike requireme	frequencies based on monthly, quarterly, ents for each set with the senior chemist.	, or task			8		00-PZ-18RSW-X	ad .
	6.1	Were project-specific MS/MSD	s analyzed? List project samples that were sp	piked.	/				DC-PZ-18RSW-1	cms
ACTIO	N: If no,	contact senior chemist to see if a	any were specified.		Yes [V]	No [_]	N/A []	Comments:	OC-PZ-18RS W-X	/25
	6.2	Is the MS/MSD Recovery Form	m present?		/				· ·	1120
ACTIO	N: If no,	contact lab for resubmission of	missing data.		Yes [V]	No [_]	N/A []	Comments:		
	6.3	Were matrix spikes analyzed matrix?	at the required frequency of 1 per 20 same	ples per	Yes []	No[]	N/A []	Comments:		
ACTIO	N: If any	matrix spike data is missing, ca	all lab for resubmission.							
	6.4	Are any wet chemistry analyte	spike recoveries outside of the QC limits?		Yes 🗹	No []	N/A [_]	Comments:	Ammonia is @ 35% MSD but is OK @ A for MS, So see n	66%
									page: No qualitie	

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	NOTE:	%R = SA	(SSR-SR)	x 100%			When	re:	SSR =	Spiked	sample resu
	38	JA.		SA = Spike a	ıdded					SR	= Sample resu
	MS/MSD Recovery Lin	nits:									
	Alkalinity* = NA	1	Bicarbo	onate Alkalinity* =	NA C	Carbonate alkalinity	* = NA	Ammoni	a* (LACH	AT) = 75.	-125% (35%)
	Chloride*(SM 4500 Cl)	1 = 75-125%	Specific	c Conductivity * =]	NA 7	Total Organic Carbo	$on^* = NA$	TDS**			
	Oil & Grease* = NA		CODL	ow* □ = 75-125%	C	COD High* □ = 75-	-125%	Nitrate N	itrogen as	N** ☑ = 75	-125%
	Nitrite Nitrogen as N** [□ = 75-125%	Hardne	ess* 🗆 = 75-125%	5	Sulfate (EPA 300.0)	* 🗹 = 75-125%	% pH* = N	ΙA	TSS* =	NA
	Other parameter(list)					5,106 635					
	* = Laboratory Limits	**	= Olin QAPP			t defined LCS rec					
	NOTES: 1) If only one 2) If the MS/M	of the recoveri SD was perfor	es for an MS/N med by the lab	MSD pair is outside poratory on a non-p	of the contro	l limits, no qualifica, no qualification is	ation is necessar	y. Use prof	essional ju	dgment for t	he MS/MSD flags.
quality]	N: MS/MSD flags only a positive results as estimate D recovery is < 30% and t	ed (J). If the re	ecoveries of the	ne MS and MSD ar	e lower than	the lower control lin	e. If the recover mit but > 30%,	ies of the M qualify both	S and MS n positive i	D exceed the results and no	e upper control limi on-detects (J). If the
ACTIO evaluate	N: Laboratory control lined, but no flags are applied	nits apply whe	n spiked samp	ole results fall within	in the normal	calibration range. I	f dilutions are r	equired due	to high sa	ample concer	ntrations, the data
	6.5 Are any RPDs for MS	S/MSD recove	ries outside of	the QA/QC limits?			/				
	NOTE: RPD = $\frac{S-D}{(S+D)}$			S result ISD result		Yes []	No []	N/A []	Commer	its:	
	MS/MSD RPD Limits:										
	RPD ≤20									3	
7.0	Laboratory Duplicate										
).										
	Are the RPDs for the lab	oratory duplic	ates <20% un	less otherwise spec	cified below?	Yes []	No [1	N/A [Commen	its: No L	LAB DUPS

ACTI	ON: If the RPD is greater than	specified limits, qualify all results for that	analyte as estimated (J).				
	pH* □ = 3%	Specific Conductivity $*\Box = 5\%$	TSS** □ = 6%		5	TDS** □ = 69	6	
8.0	Sampling Accuracy							
	najority of ground water sar dedicated tubing. Rinse bla	nples are collected directly from a tap nks will not be collected.	, process stream, or					
	8.1 Were rinsate blanks co associated samples from the	llected? Prior to evaluating rinsate blank senior chemist.	s, obtain a list of the	Yes []	No 🚺	N/A [_]	Comments:	
	8.2 Do any rinsate blanks ha	eve positive results?		Yes []	No []	N/A 🚺	Comments:	
ACT	ION: Evaluate rinsate result	s vs. blank results to determine if conta	aminant may be labo	ratory-deriv	ed If not l	ah-related a	alify accord	ing to the table below
		is $< 5 \times$ blank value, flag sample result nor						
		is $> 5 \times$ blank value, no qualification is necessary			•	J		
NOTE	: MADEP does not require	the collection of rinsate blanks.						
0.0	Field Duplicates	g						
	9.1 Were field duplicate field duplicates.	samples collected? Obtain a list of sample	es and their associated	Yes [_]	No [_]	N/A [_]	Comments:	OC- DupSW DVAS
	9.2 Were field duplicates co	ollected per the required frequency?		Yes 🚺	No [_]	N/A []	Comments:	Collected N/ Sample OC-PZ-18RSW
QA	APP/IRSWP □ MADEP O	ption 1(1 per 20) ☐ MADEP Option	3 (1 per 10) □					
	9.3 Was the RPD ≤ 30% for attach to this review.	waters < 50% for soils? Calculate the F	RPD for results and	Yes 🚺	No [_]	N/A []	Comments:	

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.				
Was any of the data qualified?	Yes []	No [V]	N/A []	Comments:
If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.				

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 5 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

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VALIDATION REPORT 480-38209-1

FIELD DUPLICATE RPD ASSESSMENT MAY 2013/SECOND QUARTER OLIN SLURRY WALL CAP GROUNDWATER

Sample ID	Analyte	Orig Conc. (mg/L) Q	DUP Conc. (mg/L) Q	RPD
OC-PZ-18RSW	Chromium - total	12	12	0
	Aluminum - total	180 J	160 J	11.76471
	Sodium - total	98000	99000	1.015228
	Chromium - dissolved	6.9	7.1	2.857143
	Aluminum - dissolved	99 J	78 J	23.72881
	Sodium - dissolved	100000 B	100000 B	0
	Chloride	160	160	0.0
	Sulflate	110	110	0
	Ammonia	28	27	3.636364
	Nitrate as N	0.22	0.22	0
	Nitrite as N	0.02 J	0.021 J	4.878049
				#DIV/0!

OC-DUP SW is the duplicate sample of OC-PZ-18RSW